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into
Residential Tenancies

Regulatory Systems and Their Applicability to Rent Controls

G. David Quirin

Research Study No. 21

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by

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Contents*

CHAPTER 4

* For additional detail, see Contents B on following page

Contents B

CHAPTER 3

CHAPTER 1

THE WHY AND HOW OF REGULATION: AN INTRODUCTION

1. Purpose of the Study

Rent control has a bad reputation, so much so that virtually no one except a few doctrinaire advocates of central planning has proposed making it a permanent feature of the economic landscape. Most protagonists of rent control feel compelled to hedge their advocacy of controls with proposals or promises to return to a free market in rental housing once the emergency which brought it forth has concluded. Unfortunately, once existing types of rent controls are implemented, the supply-side adjustments in the housing market needed to conclude the emergency are apt to be inhibited. The consequence is that whatever emergency gave rise to controls is prolonged, and that temporary controls become permanent. Rent controls in most Canadian provinces are a good example. These were initially adopted as part of the 1976-1978 Anti-Inflation Program. Most other price controls in the program were abandoned in 1978, rent controls in most provinces are still in effect in 1986.

The list of problems attributed to rent controls is a long one, including the aggravation of any pre-existing housing shortage, the encouragement of "key-money" and other black-market phenomena, and the accelerated deterioration of the rental housing stock. Overall, the performance has been bad enough to lead a well-known Swedish economist to observe "next to bombing, rent control seems in many cases to be the most efficient technique so far known for destroying cities" [Lindbeck (1972)].

While rent controls have had unfortunate results, there are other sectors of the economy where markets have been subject to regulatory control for decades, in which the horrible consequences usually identified as the "inevitable" consequence of rent controls simply have not happened. This experience indicates that while it is possible, even easy to create a regulatory system which creates or magnifies chaos, it is by no means essential that it do so.

This study is an examination of successful and less-than successful regulatory schemes employed on a continuing basis in other industries, and an attempt to identify differences between such "successful" regulatory schemes and traditional schemes of rent control, and to outline a regulatory system which could be used to regulate rents on a continuing basis without creating the problems which are all too evident in areas in which conventional rent controls have been in operation for a long period of time. Such a scheme is outlined in Chapter 4. Its principal difference from the present scheme lies in the imposition of a limit on the redistributive consequences of controls.

This study is in response to Term of Reference 1, items (a) to (c) which reads as follows:

> (a) the equity of the current system of rent review, having regard for the rights and interests of both the landlord and the tenant;
>
> (b) the effect of rent review on the level of rental rates and the supply of residential accommodation in the Province;
>
> (c) whether a more expeditious procedure should be applied to the review and decision-making process of the Residential Tenancy Commission in view of the issues being raised, the rights of appeal and the need for timely decisions.

Particular attention is paid to rate-base rate-of-return regulation which is a regulatory system in operation in a few other sectors of the economy, and to which frequent references have been made in the course of Phases I and II of the Inquiry. Failure to make any explicit provision for any return to equity investors is identified below as a significant deficiency of the present system of controls. Rate base-rate-of-return regulation is the most sophisticated of several ways of providing such a return; the study examines the problems of applying these alternatives and making them work in the rental housing context.

2. Outline of the Study

The balance of this chapter presents a short historical review which helps to place rent controls in context, then examines particular characteristics of the housing market that have practical implications for the workability of a system of controls and which are relevant for the design of such a system.

Chapter 2 reviews regulatory models in use in other industries. This review is not intended to be comprehensive so much as to provide practical examples of the different types of systems with a view to determining what they can teach us about designing an effective and workable regulatory system. Certain technical details are to be found in appendices to Chapter 2. Housing is a very capital-intensive industry; the magnitude and quality of the future rental housing supply will depend on the industry's ability to attract capital to built new units and renew old ones. Chapter 3 is an examination of the capital attraction problem which any successful regulatory scheme must solve. Chapter 4 examines some of the practical requirements which

any regulatory regime must satisfy in an industry so large, as unorganized and with as many participants as the rental housing industry. These are then used to develop the regulatory model referred to earlier. Conclusions follow in Chapter 5.

3. An Historical Review of Price Regulation

While contemporary habits of thought regard free, market-determined prices as the norm and regulated prices as the exception, it should be recalled that this freedom has been a distinguishing feature of the past hundred years, approximately, and that prior to the late 18th century, legal or customary controls on prices, whether effective or not, were the norm virtually everywhere. Smith (1776) in proposing his "system of natural liberty" was not so much describing the world as it was as what he believed it could, or should, be. Similar proposals from his French predecessors, including Turgot, Quesnay and duPont de Nemours were directed at dismantling the extremely comprehensive set of controls imposed on France by Colbert [duPont de Nemours (1768), Quesnay (1760), Turgot (1766)].

Regulated by custom or law, "just" prices were the norms of the ancient, medieval and early modern world. Even international trade between centres of the ancient world is now believed to have taken place on a fixed price basis, and markets as institutions to generate prices were essentially unknown [Polanyi et al (1957)]. While subsequent history records incidents in which the established structure of wages and prices broke down, engendering largely futile efforts to restore the status quo, e.g., in the aftermath of the Black Death of 1348-60 and in the wake of the great currency debasement following 1544, such incidents

command the attention of the historian precisely because they were exceptions to the usual way of doing things.

Even during the last 200 years, a period in which the case for free markets made by Smith and his predecessors has been well known, many parts of the world have nevertheless continued to regulate prices, either routinely or from time to time in response to situations that imposed stresses on free markets or in which their working generated prices that were politically unacceptable.

While no doubt can exist that interfered-with or controlled markets result in an economy which is less efficient than their free-market counterparts, the von Mises (1920) corollary that a centrally-directed economy must break down because of the inefficiency simply does not follow. The USSR economy has been "on the verge" of breakdown for more than 65 years, and was still strong enough, despite losses from the Stalinist purges of the 1930's and from World War II, to enable its masters to pose a serious military threat to the western democracies for at least the last 35 of those years. Without doubting that the citizens of the USSR would be better off in many respects if free markets were allowed to flourish, we can accept the evidence that the system "works" in its own fashion, and serves the objectives of the USSR's political masters. Whether any system so regulated could achieve a "western" standard of living is another matter.

In democratic societies, controls and interference with markets are imposed because people in those societies have concerns in addition to economic efficiency, and because, from time to time, they give those concerns priority over it. This should be neither surprising nor frightening.

Economists have long assumed a self-appointed role as vestal virgins in the Temple of Economic Efficiency, as advocates pleading on behalf of society's long-run interests as against the deceptive allure of the quick fix, or as Viner put it, as guardians against "old poisons in new bottles" [Viner (1940); see also Stigler (1982)]. While there is every evidence that society does not share some economists' veneration of economic efficiency as the ultimate good, western economies have, for the last 200 years, relied heavily on free market institutions. It is probable that they did so because free markets serve more than economic efficiency goals. They provide an important bulwark for personal liberty, the gateway to equality of opportunity and are a necessary incident to the institution of private property. All of these objectives are probably of more concern to the man in the street than economic efficiency. While adhering to these ideals, we have recognized that there must be limits on personal freedom, if only to preserve the freedom of others, that society's interests require limits on the opportunity of the unqualified to practise medicine, and that property rights too may be infringed for the greater good of the community. For similar reasons, governments have, from time to time, interfered with the free working of markets, temporarily or permanently, and have suspended them entirely in certain areas of endeavour.

Wars have produced inflations and brought price controls in their wake. In some situations, portions of wartime control systems have been kept in place in peacetime. Most economists would agree that in certain respects such controls are inefficient, but they are not instituted to improve efficiency as much as to equalize a burden; their ultimate objectives are distributional.

The 1970's saw, in Canada and elsewhere, a peacetime inflation of wartime proportions utterly without precedent in the peacetime experience of the English speaking world. As a response, governments in Canada and in the U.S. introduced price control schemes, including rent controls, in the full awareness of the probable inefficiencies which would result, for the usual distributional reasons. For a variety of reasons relating to distributional objectives, the rent control portions of those systems have been retained in Ontario and in several other provinces.

In subsequent sections we attempt to describe certain unique features of the rental housing market which distinguish it from other markets in which at least moderately successful regulation has been practiced, usually for decades, and to indicate the nature of the problems likely to arise in applying regulation to this market. We are well aware of the proposition that regulation in the real estate market is unworkable or at least destructive. We are also aware of the markets in which a degree of regulation has been operative for decades. In some of these there are distortions or inefficiencies resulting from the regulatory process. It would, however, be a mistake to infer that regulation has been unworkable or destructive in these industries. It may well be that direct transplantation of these models would result in an unworkable or destructive regulatory system for the rental housing market; the research of which this paper in part is intended to ensure that it does not.

Regulation here, as elsewhere, is a political process, directed at political rather than economic goals. Economists often assume that the function of regulation is to produce economic efficiency as they

define it, and infer that it is a failure when it does not. Where political goals must be served as well as economic, the problem becomes instead one of satisfying these goals at minimum economic cost; this world may indeed be "second-best" on the economist's scorecard. It need not be second-best in social terms, however.

4. The Need to Meet Economic Constraints

Assigning priority to political objectives does not mean that the economic constraints imposed by the market economy can or should be ignored. They remain as part of the environment with which any regulatory system must contend. They impose requirements which must be met, along with the political objectives, if regulators are to do their job successfully. A housing-supply system which is desired to ensure adequate housing for all at affordable cost must meet the requirement that it offers yields sufficiently attractive to attract investment from private investors or find the needed capital elsewhere. While the principle is easily stated, setting rents which are no higher than necessary yet meet the yield requirement, or even figuring out what it is, may be more difficult in a world characterized by sharp swings in interest rates; 30-day prime commercial paper yields, which are just one of many competing outlets for investors' funds, were 3.33% as recently as 1971, and reached a high of 22.10% in 1981.

"Elsewhere" in the last paragraph must be a source of major volumes of funds to whom yield is irrelevant. While this may describe some governments of bygone days, there is little in the present financial status of governments in Canada, at any level, to suggest that a role as sole lender to a housing sector prevented by regulation from attracting funds from other sources would be sought, welcomed or even accepted.

The need to attract investment funds on a continuing basis is a constraint which helps to define "affordable", since housing that won't be built is of value to nobody. While existing tenants may benefit from controls that hold rents below the capital-attracting level, they benefit, not only at the expense of landlords but of new would-be tenants who can find no accommodation. It is important that the economic constraints within which the system must operate are recognized; it is when they are not that "unworkable" or "destructive" regulation results, usually because the combination of the economic and political constraints are contradictory. Where they are not, one can design a regulatory system which meets attainable political ends. Economic analysis may disclose the extent to which such ends can be satisfied, the extent to multiple ends are mutually contradictory, and the nature of the tradeoffs between them. No more should be expected of it.

5. Historic Characteristics of Real Estate Investments

Any system of controls in the market for rental housing creates the possibilities of holding rents below long run equilibrium levels and puts at risk two of the more important characteristics of the underlying market for real estate assets. These are its liquidity and its ability to provide an inflation hedge. Both result from the existence of an active market for second-hand properties at prices which are ultimately related to the cost of the new construction with which they compete in the rental market.

(i) Liquidity

Assets are said to be liquid to the extent that they can be quickly converted into cash without loss in principal value invested.

Compared to markets for financial claims such as stocks and bonds, which can be turned into cash at known prices through active markets in a week or even less, the real estate market is relatively illiquid since it frequently takes weeks or even months to dispose of a property and obtain the cash proceeds, which are relatively uncertain at the time the decision to sell is taken. Even this, however, constitutes a relatively high degree of liquidity compared to many industrial assets for which second-hand markets, except as scrap, are virtually non-existent (vehicles, aircraft, railway rolling stock and other standardized asset types of use to other owners provide significant exceptions).

It should also be noted that, historically, real estate investments have provided a kind of secondary liquidity to the extent that mortgage loans in an amount equal to a significant fraction of market value have, at most times, been readily available. To the extent that owners have not borrowed to the limit, the ability to remortgage has provided relatively quick access to at least a portion of the market value of their equity.

The ability to borrow quickly or convert entirely to cash in a reasonable period of time is one of the major attractions of real property investments to potential investors. As such, it probably reduces significantly the yields required to bring forth such investment.

(ii) An Inflation Hedge

In our view, at least part of the saleability and liquidity of rental real estate investments is ultimately linked to their ability to perform as an inflation hedge. Values of assets in the class are derived from the rents they are able to command. These, in a free market,

are related to the rents on the new properties with which they compete for tenants. Capitalized expected rents on new properties must equal or exceed the costs of new properties including land values and current construction costs, or it will not pay to undertake new construction. Thus a link is provided between rents on competing older properties and current construction costs. This link tends to ensure that rents follow inflation in a free market. This in turn creates the inflation hedge characteristic of real property investments. To the extent that rent controls sever the market link between current construction costs and rents on older buildings, values of the latter will no longer reflect current construction costs and land values, and will reflect capitalized controlled rents in the hands of the buyer. The inflation hedge will be severely weakened. Owners and prospective buyers will no longer be able to count on disposing of the property at a price reflecting current price levels. Rental properties will be saleable at the capitalized expected values of regulated rents, but buyers will impound their expectations of inflation into the capitalization rate or will switch to unregulated forms of real estate investment. If inflation expectations are impounded in the capitalization rate without being incorporated in expected rents, regulated rental real estate will acquire most of the characteristics of bonds, without the latters' ready marketability. Despite their unattractive inflation hedge properties, there is still a market for bonds at a price that compensates for these qualities; markets for controlled rental properties also continue to exist, at a price. The real values of liquid assets held by landlords will be reduced to the extent that prices decline, and portfolio adjustments to restore liquidity will be undertaken. Lower prospective yields and the

need to restore liquidity may discourage existing landlords from further participation in this market, reducing new construction.

(iii) Diversity of Participants

The supply of rental housing is unique in the extreme diversity to be found among the organizations and individuals who make it up. While it includes corporations of extreme sophistication capable of operating effectively in a complex regulatory environment, it also includes individuals for whom record keeping literally involves records kept in a shoe box, if kept at all. This diversity will plague any regulatory scheme; to the extent that the scheme imposes additional record keeping or other compliance costs on these individuals these will have to be met out of increased rents if this important category of suppliers is not to be deterred from investment in the industry.

Record-keeping can be required, though it involves increased costs. Past records that were not kept don't exist, can't be provided, and can create a significant problem in terms of the transition from an unregulated world to a regulated one. To the extent that the regulatory scheme involves record keeping (and all except the very simplest do), it must cope somehow with the non-existence of the desired records for some, and perhaps all, of the existing stock of housing, depending on what records are sought. If costs or values are to be used as a basis for regulation, initial values will have to be found or inferred in some manner, perhaps from appraisals. If new properties are valued at cost, older ones at appraised values, a disparity of treatment is created which may have adverse incentive effects.

To date, existing regulatory procedures are most easily operated in a context in which there is very little variation in year-to-year returns on residual book value (however valued) of a pool of assets. Unlike utility or railroad plant, the typical residential rental "plant" is a single building, not a pool of buildings of varying vintages, and year-to-year returns to investment in such "plant" exhibit significant fluctuations over the life of the asset. Situations in which lifetime average returns differ widely from annual returns are common. Imposition of a year-by-year uniform return on investment in such a case would generate anomalous pricing situations in which otherwise comparable units could generate wildly different rents, depending on the ages of the buildings. This in turn could thrust the entire vacancy burden on new units, or otherwise distort outcomes. Such anomalies do not have to develop, but they can easily be generated by an ill-designed regulatory system or an ill-adapted one borrowed from somewhere else.

(iv) Critical Importance of Land

Another regulatory dilemma results because of the importance of urban land in the production of housing services. Land does play a role in the production of other regulated commodities. It contributes, for example, the land used for dams and reservoirs in the production of hydro-electric power. As such it is included, along with capital investment of several types, in the rate base which in turn enters into the calculation of allowable earnings. Much of the urban "land" required by traditional regulated industries takes the form of easements and rights-of-way for distribution systems which do not preclude certain

simultaneous alternative uses of the same surface area. The more critical parts of most utilities' land requirements are in rural areas where alternative uses are limited in number and low in value, and land generally constitutes a relatively small portion of the regulated enterprise's fixed assets. In contrast, housing (including rental housing) uses a lot of urban land, which has many alternative high-valued uses. It constitutes a much more significant share of the assets required to produce housing services.

The only traditional regulated industries which come close to housing in their appetite for urban land are railways. Where space has become valuable enough, development of air space over trackage has enabled railway land to be used for other purposes in addition to the provision of rail services.

While urban land is expensive, in varying degree, it is not its cost but its price which creates problems for the regulator. Most urban communities in Canada have experienced nearly continuous growth for the last century, and will do so for the next. Growth has brought changes in land-use patterns, and such changes will be needed in the future if full potential of urban life is to be realized. Price signals play an important role in indicating, to planners and developers, where changes in use are appropriate and desirable in terms of efficient land use.

Most of the land now devoted to housing is likely to remain so, but not all will. Some land currently devoted to low-density housing may require infill development or redevelopment at higher densities. The regulatory dilemma is that land values on parcels subject to rent controls are effectively frozen at the net capitalized value of the

permitted rents, with due deductions for the operating expenses and the capital cost of improvements. Such frozen rents will not provide signals to undertake infill development, or redevelopment at increased density. Unless a way is found to reflect land market signals in the regulatory process, land now devoted to low density housing will stay that way or be diverted to non-housing uses.

The former outcome will result in excessive low density development and sprawl with concomitant waste of resources for utility and other services. Diversion is a possibility because non-housing uses, and non-rental housing uses, will continue to grow as the community grows, and will increase the value of land devoted to these uses. This, in turn, will create pressures for premature demolition on land currently devoted to rental housing, in order to make it available for an unregulated use. This too creates wastes.

There are ways of dealing with the dilemma, but none are entirely satisfactory. One is to invoke the notion of dedication to public use, and forbid change in use without regulatory approval. The frequency with which such approvals are granted and the criteria used to select the beneficiaries are obviously critical; too little and inefficient sprawl will result, while too many may well undermine the regulatory edifice of which they are part.

An alternative would value land in the regulatory process at its (estimated) market value. This would avoid premature abandonment, and encourage efficient use. Such a scheme, however, involves giving up what many partisans of rent control view as its raison d'etre, namely the capture or at least elimination of the "unearned increment" to land values so coveted by nineteenth century reformers [George (1896)].

(v) Dependence on Mortgage Finance

If anything the secondary liquidity property of real estate investment, via the mortgage market, is even more dependent on the inflation hedge characteristic. This is because properties tend to be financed at amounts near the maximum loan value when purchased. If the property does not appreciate, the owner's borrowing capacity will be limited to the amount already paid off plus any unused fraction of the original debt limit. If inflation expectations rise, the market value may even decline, restricting borrowing opportunities even further.

Thus it is important that any regulatory system envisaged be examined in terms of its impact on the resale market for rental properties and on debt-carrying capacity. In general its effects will be additive to other risks already faced by the prospective landlord. A system which does not provide for increases in rents to cover owners' increased financing costs due to increases in the mortgage or in mortgage rates will restrict and may well eliminate secondary liquidity; one that allows such increases without restriction is an open invitation to borrow to the limit imposed by the most imprudent lender in order to raise rents. This destroys secondary liquidity in another way. A system which allows the pass through of increased financing costs incurred by a new buyer, but not by an existing owner will create a value discrepancy between owners and buyers and may, as Ontario experience has shown, lead to "churning" in the market for rental properties. They will be passed from hand to hand, at successively higher prices until the debt load is all that can be justified by market-clearing rental. At such a point, the controls, of course, cease to have any meaning.

Few if any regulatory systems in the traditional regulated industries make any provision to ensure that the assets used to produce the service are marketable as such; indeed many systems prohibit the disposal of such assets without special permission, which is not routinely given. Investor liquidity in these industries is provided by the universal use of the corporate form. The assets cannot be sold, but the financial claims which they represent can be.

(vi) Potential Use of the Corporate Form

One solution to the problem of maintaining liquidity for investors while effectively eliminating it for the properties themselves is to encourage wider, or even compulsory, use of incorporation. This is a doubtful solution. Many rental properties are already in corporate hands. Many others, however, are qualified as Multiple Unit Residential Buildings under the Income Tax Act. These are owned by individuals who wish to pool gains and losses from a variety of activities, some of which cannot be incorporated, under individual personal ownership for tax to the corporate form. In any event, it is the concentration of large groups of assets in a publicly-traded corporate vehicle that creates liquidity for the regulated utility investor as it does for the investor in a publicly-owned realty company; the mere fact of incorporation is not enough.

6. Conclusions

One good place to look for possible improvements or useful modifications in rent control schemes is at successful price control schemes in other industries, some of which have been operating successfully for well over half a century. One problem that the more successful of

these have coped with effectively whereas rent control schemes on the whole have not is that of attracting the capital required to meet continuing growth in demand for their services. This is not a simple matter as the requirements of the capital market are subject to continuous change. There is no simple formula which can be applied.

This chapter has also reviewed some of the features which have characterized investments in rental housing and which must be taken into account in the design of any regulatory scheme. Historically, rental property investments have been moderately liquid and have provided as good an inflation hedge as could be found. In the past, the value of the inflation hedge provided by rental property has overcome any reservations resulting from limited liquidity and has attracted capital from an astonishing variety of sources. Regulation has severed the mechanism by which the inflation hedge operated, though not necessarily the belief in real estate as inflation hedge. It has, by discouraging many would-be buyers, reduced the market depth on which liquidity depends. These two factors, as well as the reduction in prospective yields, have created capital attraction problems which are a major deficiency of the present rent-control scheme in Ontario.

Further problems are posed by the importance of urban land to the rental housing market and of rental housing to the urban land market, respectively. To what extent can changing patterns of occupant preference (e.g., for condominiums) and land use (including non-residential) be accommodated within a rent control system? The simplest solution is to freeze land in existing uses; this one is workable only in the short run and will create escalating problems as the term of the freeze grows.

Many individuals and institutions now own rental housing properties. The very number and diversity of the owners poses a final problem for any regulatory scheme, since it is not clear that a scheme which would be acceptable to one group would necessarily be acceptable to others. This is not an area where counting heads to find a majority will solve much; the future of the housing market requires the continuing participation of nearly all existing participants or their replacement by others who are currently non-participants.

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CHAPTER 2

REGULATION IN OTHER MARKETS - LESSONS FOR HOUSING

1. Introduction

As noted in Chapter 1, the history of price control is about as long as the history of civilization. Nevertheless, price controls are not a prominent feature of industrialized western economies, and many would attribute those economies' success in achieving high standards of living to their leaving the determination of prices to be worked out in the marketplace. However, even in these economies, which rely predominantly on market-determined prices, there are sectors that have been, for varying periods of time, subjected to price controls. In some of these instances, regulation has been relatively successful, in others less so. In none do conditions correspond precisely to those found in the rental housing market. However, most have one or more features in common with the housing market, and their successes and failures can provide insights into the functioning of the regulatory process which can be useful in designing a regulatory system for the housing market. Because of the unique features of the rental housing industry, it will have to have its own unique regulatory system. Many of the components of that system will, however, be similar to components found in other regulatory systems, and the experience of other systems provides the best evidence available to use of how these components function in practise. While it is necessary to keep in mind the different circumstances of different industries, looking at regulatory experience across a wide range of industries and regulatory systems should at least enable us to avoid the more serious mistakes that have plagued inappropriate or badly-designed regulatory systems.

2. An Examination of Alternative Regulatory Models

For purposes of discussion and review, the hundreds of regulatory systems which have been used in fixing prices over the past 200 years or so may be reduced to three classes, with a small number of subclasses in each. The three basic models, in order of increasing complexity, include the following:

a) systems which set prices directly, with no direct consideration of the impact of regulation on profits. This class of system will be referred to as a price freeze systems.

b) systems which consider profits in setting prices, using profit margins (profits expressed as a percentage of sales) or markups on cost to establish allowed prices. These systems do not consider investment or capital employed explicitly, and will be referred to as margin control systems.

c) systems which take explicit account of capital employed in establishing the markups on accounting costs used in setting prices. These systems will be referred to as cost-of-service or rate-base-rate-of-return systems.

In practise a number of variants of each of the above types will be found. Indeed, if full account is taken of the local idiosyncrasies which find their way into the practise of a particular regulatory agency in dealing with certain types of companies, there may be as many variants as there are regulatory bodies, and possibly more. Many of these local peculiarities are of trifling importance, however, and a few main variants can be distinguished in each case.

While experience in some industries has led to a historical succession from type (a) to (b) and then to (c) as legislators sought

to remedy the more obvious defects in an existing system, usually by adding refinements, this has not always been the case. Some have stopped at (a) or (b) and found it perfectly satisfactory in terms of perceived needs. In other cases, regulation of type (c) was instituted at the outset. Which is appropriate for a given industry at a given time depends very much on the characteristics of the industry being regulated, the overall economic climate, and the political objectives which regulation is intended to serve.

An alternative to the above classification, which is based on how allowable profits are established (if they are) is a classification based on how long the controls are intended to remain in place. There is a general belief that if controls are to be temporary, simpler systems will suffice and indeed must do so if only because of the cost of establishing the more complex models and the time needed to get them working "properly". While this is perhaps so, experience suggests that many "temporary" schemes tend to be kept in force for longer than anyone intended. Indeed, as a rule of thumb, the longer they are in effect, the harder it may be to abandon them or to move to a more appropriate form of regulation. If there is a golden rule of regulatory design, it may be to design a regulatory system on the assumption it will be in place forever.

In the following sections, we describe a number of variants on each of the basic regulatory models described above, and provide examples of situations in which the model has been used. These are intended to be examples only; this section is not intended to provide a comprehensive historical review of the world's regulatory systems. The examples have,

however, been chosen to highlight the typical problems associated with the systems being reviewed, in particular with the problems which emerge in an inflationary environment.

(a) Price Freeze Systems

Price freeze systems, of which wage freeze systems are a distinct subset applied to the labour market, are the oldest form of controls; historical examples date back several hundred years. They are also the simplest. The legislation either sets a price in legislation or specifies that existing prices are to remain in effect, either indefinitely or for a specified period. There may or may not be provision made for the changing of prices by a designated agency. A price freeze with no provision for change short of repeal or amendment of the legislation imposing the freeze will be referred to as an absolute freeze. Where power to alter the frozen price is delegated, the power may be plenary, or it may be restricted to permitting specified cost changes to be passed along. Where the power to alter is plenary, the resulting system will be referred to as a freeze with ad hoc increments, where it is restricted, the resulting system will be referred to as a freeze with selective pass-throughs.

(i) Absolute freezes

Legislation fixing tolls on turnpikes, canals, ferries, and railroads at specified levels is the characteristic form of price regulation for such monopolistic enterprises found in the 18th and the earlier part of the 19th century. Many early railway charters, for example, specified fares and tolls for the carriage of goods from place to place. In general, it appears that such direct regulation of prices proved clumsy, ineffective

and largely unworkable, and more sophisticated regulatory systems were evolved later in that century in an attempt to overcome the practical difficulties attendant on the use of the absolute price freeze.

In Britain, prices rose nearly 80% in the decade 1790-1800, and a further 6.5% by 1810. Enterprises operating under prices fixed by legislation at earlier levels were simply unable to meet their expenses. In many instances, relief was provided by amended legislation. There was a significant drop in prices during the two decades following the end of the Napoleonic Wars, and prices which had been fixed at wartime levels became unduly oppressive at newer, lower wage levels. It should be noted that in general, rates of change in prices during the 19th century were modest when compared with experience in the 20th. Experience with prolonged absolute freezes was unsatisfactory in the 19th century because of changing price levels. While such freezes have been attempted for prolonged periods in the 20th century, experience has been even more unsatisfactory.

(ii) Experience With Absolute Freezes

In the 20th century, absolute freezes have, therefore, most typically been used for short periods, often in response to emergency situations such as the outbreak of war, and most usually as a transitional measure intended to keep the lid on prices until a more subtle and effective control system could be devised and implemented. Where controls of this type have been left in place for longer periods, the characteristic problems which led to dissatisfaction with this type of control in the 19th century have emerged.

From an economic efficiency point of view, the problem posed by absolute price freezes depends on the environment in which they are imposed. In a stable price environment, the existence of controls prevents the adjustment of the relative prices through which the economy adapts itself to economic change. Where price levels are changing, which is the more usual situation, and where only some prices are effectively regulated, the problem is that regulation produces changes in relative prices which are, as often as not, perverse, and which lead to unsought-for and often undesirable supply-side adjustments.

For example, a price freeze applied to "necessities" in the face of inflationary pressures reduces the prices of the controlled "necessities" relative to those of uncontrolled "luxuries", encouraging an increased supply of the latter but a diminished supply of "necessities."

Administratively, an absolute freeze appears to provide the simplest form of price control. This appearance is deceptive, and systems which are inadequately policed will generate a variety of predictable problems.

First of all, a number of commodities which are internationally traded are essentially beyond the reach of price controllers in any jurisdiction, particularly in one which is small relative to the world market. If the frozen price is held below the world market price for any of these commodities, supply will simply dry up, unless additional regulation is imposed forcing domestic producers of the commodities to supply the domestic market first. Shortages will still emerge unless the jurisdiction is a major exporter; Canada could presumably impose a freeze on domestic wheat prices and get away with it as long as the

Wheat Board was forced to supply domestic markets first, as it did during World War II. Where such commodities serve as major raw materials or other inputs to the production process for particular finished products, supply of the finished products will be affected. If the raw material price is frozen and supply disappears, a shortage of the finished product will ensue. If the raw material price is exempted from control, but the finished product price is not, the result will be the same, as profitable production of the finished product is made impossible.

Housing is the classic example of a product which is not internationally traded or even traded between localities; there is accordingly no question but that local controls can be effective. Many building materials are, however internationally traded, and the international character of the market for financial capital, a most necessary ingredient on the supply of housing, is well known. A continuing supply of financial capital is, for practical purposes, essential not only for the financing of new construction, but to ensure continuity in the supply of the existing stock. Inability of landlords to renew mortgages, or to earn rents which cover mortgage costs, will not remove the physical units, but will lead to foreclosures and other disturbances in the market.

In general, when controls will breed shortages, both sellers and buyers will have an incentive to evade the controls, and will do so to the extent that the policing system permits unsupervised transactions to slip through the cracks. A less-than-perfectly policed system penalizes the law-abiding, whether sellers or buyers, and rewards those who evade the law, with higher profits if they are sellers, with more adequate supplies if they are buyers.

Absolute freezes also raise questions in respect of equity. There is at least a presumption that contracts entered voluntarily, in the absence of controls, are perceived as mutually advantageous, and to that extent equitable, by the parties. There are, in most markets, a wide variety of contracts in existence at any one time. Some call for delivery over a period of time at specified rates, others are "spot" contracts covering a single sale only. Long-term contracts or leases offer advantages to both parties at the time they are entered into; the user obtaining security of supply at a known price, the supplier obtaining a guaranteed market at the specified price. The multiplicity of contract lengths in a given market situation is further complicated, in an inflationary context, by a multiplicity of effective dates and effective prices. A three-year contract entered today will ordinarily embody a price different from one entered thirty-two months ago; in the normal course of events the latter will be renewed at a still-higher price in four month's time. A freeze simply converts all existing contracts to contracts of indefinite term, and will, unless accompanied by a mechanism for rectifying prices to a common effective date, provide the buyer with an old contract with a continuing advantage over his competitor with a relatively new contract; and where a spot/term differential in prices existed, it will be carved in stone for the duration of controls.

The fact that prices are in a continuous process of adjustment in a free economy means that, at any particular point in time, the distribution of profits as between suppliers is to a considerable extent random. The tendency toward equality of profit rates is nothing more

than a tendency, and one which is dependent on continuing adjustments in prices, inputs and outputs for its realization. This process is stopped by an absolute price freeze, at least as far as the price component is concerned, and the random distribution of profits which existed at the onset of controls is frozen in place for the duration. Some producers will cut output where this is allowed, others will cut inputs and product quality, in an effort to attain the best possible return on their investment.

While the basic economic model predicts that, where the effect of a freeze is to hold prices below the levels needed to clear the market or to cover long-run marginal costs, a reduction in quantity or quality supplied, or both, will take place, the rapidity with which this will occur is dependent on the extent to which capital in the industry is fixed and specialized, as opposed to liquid, versatile and therefore mobile. Where the basic investment is in a dealer's stock in trade, he will liquidate that stock, take the proceeds and invest them in a more remunerative line of business; in such a case a freeze may cause supply to dry up completely in a few days or weeks; where specialized fixed capital is involved, it may be impossible for any producer to withdraw except by discontinuing all maintenance except for those items which prevent the immediate cessation of revenues, gradually liquidating the investment. Others will not withdraw, but will simply reduce quality. While this process may take years to complete, it will begin to have an impact on supply, particularly on quality, immediately. Where it is possible to convert the asset from regulated to non-regulated use, the impact will be accelerated. Thus, an apartment block which is subjected to rent controls may be converted to condominium ownership or to a hotel, if regulation permits.

The present Ontario rent control system is perhaps most analogous to a freeze with ad hoc increments. It has allowed annual increases fixed in percentage terms, in most years these have been less than the prevailing rate of inflation as measured by the Consumer Price Index. Increments exactly equal to the inflation rate are of course the inflationary-climate counterpart of an absolute freeze in a stable price level context. The basic difficulty with systems of this type is their failure to make any provision for changes in relative prices. Where the permissible change in absolute levels is less than the rate of inflation, there is a further difficulty with respect to the average absolute level of prices.

These effects of price freezes are well known. In an effort to avoid or mitigate their impact, a number of jurisdictions have employed variants of the basic freeze mechanism in various markets, or departures from it, in an attempt to create a "workable" system of regulation. Indeed the present Ontario rent control system is of this character, inasmuch as it allows for the selective "pass-through" of certain cost increases on a case-by-case basis. It is not clear that this system of review is effectively accessible to, and useable by, the majority of small landlords; it is certain that a number of types of cost increases do not qualify for "pass-through" treatment. For those unable to use the case-by-case review system for either reason, the operative system is that of a freeze with ad hoc increments less than the inflation rate.

(iii) Freezes With Selective Pass-Throughs

As noted earlier, a price freeze applied in a single jurisdiction, no matter how inclusive, will not be able to control the prices of goods

or services produced outside that jurisdiction. Imported products and those dependent on internationally traded inputs are beyond the control of a national price freeze; where the freeze is applied at the provincial or municipal level an even greater array of goods and services will be beyond the reach of the control mechanism. Still other goods and services, while locally produced, will be exempt from all but the most-inclusive control system.

To the extent that such uncontrolled goods and services are essential inputs in the production of a controlled good or service, increases in their prices will increase the costs of producing the controlled good or service.

Such cost increases are the major factor reducing nominal profits among producers of controlled products. If controls were as successful in controlling costs as they are in controlling revenues, nominal profits would simply be frozen at their pre-control levels. Any reductions in nominal profits serve to exacerbate the decline in real profits which results from price level increases, and to increase incentives to degrade quality or divert output to uncontrolled markets.

A temporary freeze may ignore such cost changes with impunity, a permanent system of controls cannot. In situations where a temporary freeze is replaced by a margin-control or cost-of-service system, the problem is, at least in principle, taken care of. When no such replacement is provided, most control systems require modification to permit at least the more general and more obvious cost increases to be passed through. When this happens, the system is converted from a simple freeze to a freeze with selective pass-throughs. Such pass-throughs permit all or a major fraction of cost increases in specified categories to be passed

through and incorporated in the product price. Thus, for example, retail outlets may be permitted to pass on increases in wholesale prices, but no other increases in costs. Manufacturers may be permitted to pass on increases in fuel costs or the costs of certain raw materials, landlords the costs of fuel and utilities. Most, however, do not permit the pass-through of all increases in economic costs.

Systems of this kind appear to be adopted instead of margin control systems or full cost-of-service for a number of reasons. One is simply administrative. Allowing the passing-on of costs which are general in their incidence and easily verifiable in their amount provides a degree of flexibility to the system without an undue increase in its complexity. A second is the belief that allowing controlled firms to pass on all cost increases destroys their incentive to avoid or resist such increases and thus weakens the effectiveness of the control system. Unfortunately, a less-than-100% pass-through of all incremental input costs does not so much provide an incentive to avoid unnecessary additions to costs as to avoid all unrecoverable additions, since each increment will cut into an already-reduced profit. This is a corollary of a well-known theorem in regulatory economics which asserts that permitting more-than-100% recovery of the cost of an input will distort production decisions, encouraging excessive use of the input so treated, a phenomenon sometimes known as "gold-plating". [Averch and Johnson (1962)]. For an empirical test in a cost-of-service context see Callen (1976).

As noted above, for many landlords the Ontario Rent Review system is a freeze with ad hoc increments. In our view, it is a freeze with selective pass-throughs for many others. It does allow certain specified

operating costs to be passed through, but no others. It conspicuously fails to make any allowances for changes in the opportunity cost of the serviced land input or that of equity capital, and restricts the pass-through of debt costs. Nor is any provision for remunerating small landlord's "sweat labour" applied to maintenance or capital improvements.

(iv) Experience With Selective Pass-Through Systems

Selective pass-through systems may restrict the cost increases eligible for pass-through treatment either by enumeration or exclusion. The most-frequently-excluded categories of costs are those related to the use of capital, including interest, depreciation, and return to the equity investor. There are exceptions. Ontario's current rent control program does allow the eventual pass-through of increased financing charges, the blended sum of interest and principal required to amortize a mortgage, but excludes pass-through of any explicit element of depreciation or return on the owner's invested equity. The only financing charges that can be passed on by an owner are those resulting from a change in interest rates; an existing owner cannot pass through an increase resulting from an increase in the principal amount of the mortgage and thus must gradually reduce indebtedness to zero as the mortgage is amortized. A new buyer can pass-through the costs of a reasonable mortgage assumed at the time of purchase; even here there are restrictions in the extent of pass-through available [Rent Review Guidelines, Guidelines RR-2 (Nov. 10, 1982), para. 5., Guideline RR-4 (Nov. 10, 1982)].

It should be noted that the portion of recognized financing costs that is represented by mortgage amortization payments is not an economic cost; it is explicitly offered in lieu of depreciation and implicitly in lieu of a return on invested equity capital, both of which are economic

costs. Any correspondence between the magnitude of the included non-cost and the excluded costs is likely to be largely coincidental.

Two effects flow from this treatment of financing costs. The first is that while the owner can, and ordinarily must, build up equity in the property as the debt is amortized, there is no related increase in the cash flow stream resulting from the building up of equity, and rates of return on equity decline as equity increases, at least until the debt is fully amortized and such portion of the former financing cost as remains becomes return on equity. The provision for ad hoc 6% or 4% increases in rents may, under certain circumstances which seem implausible, create an increase in equity returns. The only way the investor can get a return on invested equity he has accumulated on the buildings is by selling it at a premium over the present value of his expected net rents, and investing the proceeds in something else. He can do that only in the very special circumstance that he can find a buyer to whom the property is worth more than it is to him. The ability of a new buyer to pass through the costs of a larger mortgage which a present owner cannot create this kind of a value discrepancy, as exemplified by the "flips" of the Cadillac Fairview properties. The subsequently-imposed restrictions on pass-through of financing costs reduce the discrepancy, probably to the vanishing point in some cases. In such cases, the landlord is no worse off to continue to hold the property. For the others, the incentive to sell increases the longer the building is held.

On the opposite side of the present owner's increasing incentive to sell is the ability of a new buyer to raise rents to cover a new mortgage. As noted, this makes the building worth more to a new buyer than to the seller, creating an enhanced incentive to turn over properties.

One inhibiting factor is of course the restriction on full pass-through of additional financing costs during the first five years. Another is the high political risk that must be attached to rent increases anticipated under the present system of controls, which must, in the light of experienced changes in the system, be discounted at a higher rate.

While it is possible to model the performance of any given regulatory system which provides partial and selective pass-throughs of cost increases, it is impossible to generalize about such systems because they may assume so many forms. In most cases, because the pass-through of costs is only partial, they generate a shrinkage in profits and an adverse supply response. Such an outcome is by no means universal, and an examination of each individual systems' dynamic response path is essential if the full ramifications of the system are to be understood.

(v) Freezes With Ad Hoc Increments

This term is used to describe a control system in which the regulator adjusts prices in an effort to "fine tune" the market and to induce increases in supply without permitting the price changes which would clear the market. A number of rent control systems in U.S. jurisdictions are of this type, in that arbitrary increases in rents are permitted for certain types of improvement (e.g., a new refrigerator, redecorating) and where the relation between the cost of the improvement and the rent increase is arbitrary and more or less tenuous.

A further classic example is provided by the U.S. experience with controls on the wellhead prices of natural gas and, later, of crude oil.

U.S. natural gas wellhead price controls were first applied in 1954 when the U.S. Supreme Court ruled that, despite apparent legislative

direction to the contrary [Natural Gas Act (1936) sec. 1(b))] the Federal Power Commission (as it then was) had the responsibility to regulate the prices and terms under which natural gas was sold by independent producers to pipeline companies [Phillips Petroleum Co. v. Wisconsin et al, 347 U.S.672; 3 P.U.R. 3d. 129 (1954)].

The effect of the Phillips decision was to refer a case back to the F.P.C. which had declined jurisdiction in the first instance. In the meantime, the latter had, in the light of the drastic reduction in exploration and production investment by pipeline companies since it had applied cost of service regulation to their producing activities, concluded that its inclusion of pipeline-produced gas in utility operations had been a mistake. To avoid these undesirable consequences it had applied an arm's length market price standard to pipeline-produced gas [Re Panhandle Eastern Pipeline Company (Docket G-1196 et al) 3 P.U.R. 3d. 396 (1954)].

Gas producers selling to interstate pipelines under F.P.C. jurisdiction were ordered to apply for the certification as "Natural Gas Companies" under the Act and existing contract prices were treated as initial rate filings until such time as prices could be examined. All price increases due under existing contracts were deferred.

Shortly after the Phillips decision, the D.C. Appeal Court rejected the "fair market value" standard the F.P.C. had adopted in the Panhandle Eastern case. The Supreme Court declined to review [City of of Detroit v. F.P.C. 240 F. 2d 810, 11 P.U.R. 3d 112, cert. den. 352 U.S. 829 (1955)]. While City of Detroit did not preclude the use of fair market value evidence, it required that the rate base-rate-of-return method described below be used at least as a basis of comparison or a point of departure.

While continuing to pay lip service to the rate-base rate of return formula, the Commission moved in the direction of what was to become known as the "area pricing" standard in a series of decisions in which the application of the rate base method was claimed to be patently unworkable. In one case, involving 11 operators and 133 working interest owners in 754 leases in a single field, the Commission noted that application of strict cost-of-service rules would result in at least 11 different prices for various parts of a stream of commingled gas, and proceeded to look for alternate evidence of reasonableness. The Phillips case had been re-opened by the F.P.C. following the Court's ruling in 1954. Hearings before an examiner were held for 82 days in 1956-57, involving 72 lawyers for Phillips, the F.P.C., and 31 intervenors, filling 10,620 pages of transcript and 235 exhibits. Thirty-four months after the opening, an examiners' decision based on his interpretation of how a cost-of-service rate should be established was filed. After further hearings and review by the Commission, a decision was filed in 1960.

The Commission noted, in the preamble to its decision

> "Experience of the Commission in the case, as well as in many other producer rate cases during the last five years, has shown, beyond any doubt, that the traditional original cost, prudent investment rate base method of regulating utilities is not a sensible, or even a workable method of fixing the rates of independent producers of natural gas."
>
> "We are convinced that such a method is unworkable, and will produce fallacious results."

It is tempting to suggest that this finding was, at least in part, inspired by the examiner's finding that Phillips' cost of service was $9.3 million higher than its revenues under existing contracts.

Having examined reasons why rate-base regulation would be unworkable in the context, the Commission then introduced a system in which ceiling rates were to be set for different geographic areas. Separate ceilings were to be applied for old gas and newly contracted gas. These were to be based on existing contracts and costs for "representative samples" of producers. This decision was upheld by the Supreme Court in 1963, only 16 years after the first complaint had been filed.

The F.P.C. found, in 1960, that Phillips' cost of service for 1954 was well in excess of the prices it was receiving, which had been frozen at 1954 levels. Similar excesses of costs over prices were found in ten out of eleven other cases on which cost of service calculations had been completed by the time Phillips was decided. (Calculations in the eleventh were ambiguous.) Given that this evidence related to test years in the mid-1950s, and that prices had remained frozen at those levels, the disparity between costs and revenue was if anything more pronounced by 1961. Thus the decision to impose area prices was a decision to retain ceilings set by freezing market prices seven years earlier in spite of evidence that they were below average costs even then. Somewhat higher ceilings were set for new gas, more or less arbitrarily decided on rule-of-thumb considerations which may have made them approximately equal to 1954 average costs but not to 1961 marginal costs. There were occasional increases in the new gas price from time to time, but the essential thrust of the regulatory effort remained as set in 1961.

The experience with Phillips is of relevance for rent control systems for several reasons. The first is that the economic structure of the rental housing industry resembles that of the natural gas producing

industry. There are a large number of producers and concentration is low. The application of a strict cost of service standard could easily lead to the same kind of problems found in Phillips, i.e., a different price for each separately owned but otherwise identical or at least comparable unit of output. The locational uniqueness of each rental unit may simplify matters slightly, but there are conceivable problems in respect of units held in joint or common tenancy by several landlords having different cost bases.

Secondly, the problems experienced in attempting to apply the "area price" system indicate that a system of this type can be very complicated and expensive without being successful in any recognizable meaning of the word.

The problem of differing costs for different producers, which is pervasive in the natural gas context, has an approximate counterpart in the rental housing market in that many owners of relatively comparable units have widely differing historical costs. In the natural gas case, the product is fungible and the problem is, at least in part, resolved by charging all consumers a blended price for a commingled stream of gas, or by allowing all buyers proportionate access to the individual streams with different costs. Achieving this same result in the rental housing market would probably require the creation of a central rent collection agency which would collect quality-adjusted rents from all tenants while paying individual landlords their individual costs. Just such a scheme is operated by the Alberta Petroleum Marketing Commission in a context much like that discussed above. A problem faced in the rental market but not in that for natural gas is the heterogeneity of individual units. The determination of "fair" quality differentials would

be a serious problem. In contrast, streams of natural gas differ relavantly only in Btu and sulphur content and these are easily incorporated into a differential pricing scheme.

(vi) Experience Under Ad Hoc Increments - Natural Gas and Oil in the U.S.

The results of regulation of the type imposed by Phillips, with ceilings set below costs, were or should have been, predictable. Exploration for gas all but ceased, supplies dwindled and "shortgages" developed. Gas was imported from Canada, Mexico and elsewhere to offset these shortages, at prices well in excess of those offered to U.S. producers.

The most complete analyses of the impact of regulation are those conducted by MacAvoy and Pindyck (1973) and by Breyer and MacAvoy (1973).

Output shortfalls, as measured by curtailments of service, were 3.6% of sales in 1971 and 5.1% in 1972. A comparison of the shortfall between new reserves desired to be contracted by pipelines and those available, which is perhaps a more relevant measure of disequilibrium, indicated a chronic shortfall of 50% over the 1960's; new customers were simply turned away by the pipelines and distributory utilities. Curtailment of deliveries where necessary were imposed on industrial users. In Cleveland alone in January, 1970, 30,000 employees were laid off as a consequence.

The McAvoy-Pindyck article examined policy options and concluded that decontrol would eliminate the supply shortfall within a very few years by constraining demand growth and encouraging new supply. Other options examined offered the prospect of a continuously increasing supply deficit, albeit at lower prices.

However, such a straightforward solution was unobtainable. While the failure of existing natural gas regulation was generally recognized, there was no unanimity about the reasons. Legislators from consuming states, who outnumbered those from producing areas, blamed all the difficulties on insufficient regulatory vigour and on withholding of supplies or their diversion into the unregulated intrastate market. To this was usually attached the revelation that all was part of an oil company plot to force an end to regulation. With such a diagnosis it followed that the "solution" was to abolish the exemption for intrastate sales; deprived of this loophole and of any prospect for escaping regulation, the villains in the piece would stop withholding supplies and the problem would go away.

Deregulation proposals, whatever their merits, were simply not acceptable in the early 1970's because their thrust ran counter to that of economic policy generally. A major feature of the latter in the 1971-1973 period involved generalized price controls under the so-called Economic Stabilization Program, remembered as Phases I, II, III and IV. Phase III, which was "voluntary" began in January, 1973. It imposed mandatory controls on major oil companies by executive order.

The failure of limited controls under Phase III was attributed to its restricted scope; Phase IV, introduced in August was comprehensive and created a set of price controls for crude oil generally parallelling those already in place for gas. Those were, however, administered initially by the Cost of Living Council, subsequently by the Federal Energy Office and the Federal Energy Administration. Gas controls continued to be administered by the Federal Power Commission, subsequently renamed the Federal Energy Regulatory Commission (FERC). Oil price

controls are reviewed below. They involved even less "due process" than the gas regulations and produced bigger disasters even more quickly [MacAvoy (1977)]. Phased decontrol was initiated under the Carter Administration and all remaining controls on crude oil were abolished by President Reagan in early 1981.

A step toward eventual deregulation of gas prices was taken in the Natural Gas Policy Act, passed in October 1978. The NGPA was a legislative monstrosity that attempted to combine the "make it comprehensive and hit them harder" approach with the "deregulate" approach in a single piece of legislation that everybody could vote for. Given the divisions in Congress on this topic it was perhaps the only kind of legislation that could have been enacted. The statute itself runs 66 pages, the regulations under it had run to 364 within four months of passage. It replaced the simple old gas-new gas dichotomy of the FPC's field price approach with some three dozen different categories. It provided for somewhat larger increases for most of these categories, up to 2 1/2¢ per Mcf (Thousand cubic feet) per year as opposed to the 1/2¢ which had been allowed under the former scheme, allowed escalation at the cost of living rate for the first time in the old gas prices which had been pegged since 1954, and created several new "new gas" (post 1978) categories that would receive wellhead prices of $2.10 per Mcf rather than the 50¢-80¢ range applied up until that time. More importantly, it provided that the new "new gas" category would be deregulated completely by 1985 and certain others by 1987. An estimated 60 percent of production would have remained regulated in 1987 if the Act were still in force at that time.

Natural gas prices were deregulated in the early years of the Reagan administration. Prices climbed initially, then fell within a matter of months. A surplus of gas developed in the U.S. and consumption of imported Mexican and Canadian gas, for which contract prices were now in excess of U.S. free market prices, slumped drastically.

Oil price controls were imposed in 1971 under the Nixon administration. An immediate impact, since prices were frozen at summer 1971 levels, was a fuel oil shortage in the winter of 1971-1972. This occurred because the normal seasonal variation in relative prices of fuel oils and gasoline which accompanies and encourages the shift to the production of the former in winter and the latter in the summer did not, could not, take place. It was recognized that, if complete dependence on imports was to be averted, some means of stimulating domestic output had to be found. While the potential incentive effects of higher prices were recognized, it was successfully argued that there was no need for customers to pay the higher price for any of the oil that was currently being produced. The fact that it was being produced at the existing price was "proof enough" that its cost was less than the existing price. Incentives were only needed for deeper pools, offshore pools, and assisted recovery projects which were uneconomic at frozen prices.

Thus was born in 1977 the old-oil/new-oil two-price system for crude oil under which the U.S. operated until oil production was decontrolled under the Reagan administration in 1981. Under it, the price of "old oil," mostly oil from pools discovered before the inception of controls in 1971, remained frozen. A higher, uncontrolled price was provided for new oil. A third category, "released oil" consisted of

decontrolled oil in an amount equal to the amount of "new oil" produced by each producer.

The system had several defects of which the most serious were the following:

(1) The imposition of controls on new oil in 1974

While the opportunity cost of incremental oil supplies to the U.S. economy was, quite obviously, the cost of an imported barrel at world prices, the new oil price was held below this level, thus discouraging some potential domestic output which could have been added at a lower opportunity cost.

(2) The entitlement program.

With three effective crude prices in the market place, access to the lower-priced old oil and domestic new oil was restricted by quotas assigned to refineries on a plant-by-plant basis, just as access to formerly-cheaper imports had been rationed under the former import quota program. Like its predecessor, the entitlements program succumbed to the inevitable political pressures to make some more equal than others, and small refiners were provided preferential access to low-priced old oil. One result was not only to preserve dozens of old small, inefficient and generally wasteful refineries but to encourage the construction of new ones. These refineries, chiefly in Texas and the Rocky Mountain states, would otherwise have been eliminated by competitive pressures, as their Canadian counterparts had been in the early 1960s. The cost of this subsidy was borne by larger refiners and passed on to consumers.

(3) Rolled-in pricing.

Gasoline prices were permitted to increase only on a cost-pass-through basis. While this ensured that much of savings on old oil were passed through to consumers, as intended, it also ensured, after the old-oil price/world price differential increased in 1973, that product prices were, in general, below the opportunity cost of the crude from which they were made. This strengthened O.P.E.C., had undesirable balance-of-payments and exchange-rate consequences, and must bear a significant share of the blame for failure of a market for domestic small cars to emerge before the Iranian crisis, and for the ensuing debacle in the North American auto industry when the postponed day of reckoning was finally reached. It is no accident that OPEC's problems began after U.S. decontrol in 1981.

(4) Inappropriate Definitions.

The old-oil/new-oil dichotomy was based on the date on which a pool (reservoir) was discovered. It is a frequent occurrence in exploration for a wildcat well to discover what is at first believed to be a new pool, but which later proves to be an extension of a previously-found pool. When this happened, discoveries which had been initially treated as "new oil" were retroactively reclassified as "old oil" and producers required to refund the difference to their customers. Procedures were administratively cumbersome, time-consuming, and risk-increasing.

(5) Administrative Cost.

> The U.S. program imposed reporting costs (1975) of $157 million per year on the industry, additional compliance costs (overheads incurred in keeping within regulations) were estimated at some $520 million for refiners, between $195 and $428 million for marketers, and an unknown amount for producers. On the government side $132 million was spent. Yet, according to the Ford Administration Task Force which generated these figures, the enforcement of the regulations was ineffective. Permissible product prices were tied to 1973 base prices which differed from refiner to refiner, with a variety of adjustments. As of 1977, the Federal Energy Administration had yet to establish firm base prices. [MacAvoy (1977), ch. 2].

Despite these defects, which were well established and known not only in the industry but in government circles, the crude oil control program limped on through the term of the Carter administration, gathering employees as it went. While some decontrol initiatives were undertaken in 1980, complete decontrol did not come about until early 1981. Since decontrol, U.S. domestic exploration had increased significantly, although the OPEC surplus, partly produced by U.S. decontrol measures, has led to a reduction of exploratory activity from its 1981 peak. U.S. domestic prices have fallen since decontrol, as have international prices.

Canadian domestic prices for oil and gas have, of course, also been controlled since before the O.P.E.C. crisis. The controls have had the same arbitrary character observed as the U.S. and have created essentially similar if less-well publicized effects. When the U.S. abandoned

regulation as a bad job, Canada strengthened it via the National Energy Program.

Experience with ad hoc price controls on oil and gas prices in both countries has demonstrated the immense difficulties encountered in establishing coherent regulatory goals and in setting prices which do not have adverse supply consequence. It is difficult, on a careful review of this experience, to avoid the conclusion that both countries would have been better off if such markets as these, with whatever imperfections they possessed, had simply been left alone and permitted to operate.

We have dwelt on the oil and gas experience at length because this industry shares many of the attributes possessed by the rental housing market. It is capital intensive and the physical capital is immobile. It depends on its ability to attract highly mobile financial capital on a continuing basis. It has a large number of independent producers whose costs differ widely. In the absence of controls, or the fear of controls, both have properties that would make them an attractive inflation hedge.

Not only are the structural attributes of the two industries similar, their performance under regulation displays a number of parallels. The cessation of exploration for gas noted above is the counterpart of the decline in construction of unsubsidized rental units. Imported high-priced gas is the oil and gas market's equivalent of the construction of high priced luxury condominiums and their rental at prices above the then-applicable ceiling on controls. The turning away of new gas customers is analogous to the shrinking vacancy rates, growing waiting lists and tenant-controlled turnover in the regulated housing

market. For the old-oil/new-oil system read the (initial) exemption of post 1975 construction. This equivalence is not only in effect but in provenance; old apartments (oil) did not "need" the higher price.

Not all of the similarities are economic. The political pressure for retention, tightening and extension of controls are similar in both cases, and it would appear likely that rent controls will gather complexity as they mature, as did oil and gas price controls. We have already observed the removal of the exemption on post 1975 construction for reasons indistinguishable from those which led to the removal of exemptions on new oil in 1974. "Entitlements" to preferential treatment are held by sitting tenants, at the expense not only of landlords but of other tenants needing accommodation, and willing and able to pay more.

Like "rolled in" pricing of energy, rent controls discourage the adoption of substitutes, in this case the move to owner-occupied housing and the release of the units for occupancy by other tenants.

The oil and gas examples are useful not only because they demonstrate the effects of regulation of the type now in force in the rental housing market in Ontario, and which are beginning to make themselves apparent here, but because they have gone the full circle from control to decontrol and thus offer some idea as to what would happen if rents were decontrolled. The market clearing impact, which involves the increase in prices until shortages are eliminated would be relatively immediate, as was evident in the initial price rise following deregulation. The speed of this adjustment in a housing market is described in the analysis of the San Francisco housing market following the 1906 earthquake, reported by Friedman (1981). The existence of zoning bylaws, building codes and related controls which delay construction would

likely result in response times on the supply side of the market significantly longer than those reported by Friedman. It is this delayed response which is responsible for the magnitude of the initial climb in prices subsequent to decontrol observed in the oil and gas cases and likely to occur in a decontrolled rental market. There is no reason to believe that the subsequent pattern of a drop in real prices would not also ensue in the rental market unless prevented by regulatory or other impediments to new construction. The magnitude of the initial rise, and of the subsequent fall, as well as their precise timing would of course be dependent on the magnitude of supply and demand elasticities and on the lag structure of the adjustment processes, particularly on the supply side. These issues are not addressed here, but there is nothing about the housing market known to us which gives any reason to believe they would not take place.

(b) Margin-Control Systems

(i) Use in Insurance and Trucking

Margin-control systems of regulation include systems which provide for a specified maximum profit margin, a maximum markup on costs or a minimum operating ratio (operating costs divided by revenues) and which adjust prices so that margin, markup or ratio is maintained. Usually, financing costs are excluded from the calculation so that the return on capital employed, of any type, must come out of the profit margin provided. No explicit recognition is given to investment. Margin control systems have been fairly widely used in the regulation of property and casualty insurance and of trucking. A version of them was used on a much more general basis in Canada 1976-78 under the Anti-Inflation Act of 1975.

While there can be bad, ineffective or destructive margin control systems, depending on how they are designed and implemented, such systems

as a class are conceptually superior to price freeze systems in that they recognize the need for a profit or a return on investment and make explicit provision for it in the regulatory formula. Profit margins are a component of a well-known financial control model which is widely used in industry [Brown (1924)]. The model relates capital intensity or turnover, profit margins and rate of return on investment in the formula

$$\frac{P}{K} = \frac{P}{S} \times \frac{S}{K}$$

in which P/K is return on investment, P/S is the profit margin on sales, and S/K is capital turnover, or sales divided by capital employed. A number of studies of firms in uncontrolled industries have shown values of P/S and S/K to be inversely related, and for there to be a much narrower range of variation in P/K, which economic theory asserts will tend to be equalized throughout the market economy. Such variation in P/K as is observed appears to be explicable in terms of risk differences and the measurement errors associated with historical-cost accounting. This model has also been used by some firms [e.g., General Motors and Dupont] for setting prices to achieve a targetted rate of return on investment.

Consideration of the formula suggests that margin control systems can be regarded as a variant of rate-of-return regulation in which there is no explicit measurement of capital invested. Such a short-cut has obvious attractions from the point of view of administrative simplicity and convenience, but is obtained by sacrificing any ability to discriminate between suppliers whose operations differ in capital intensity. Accordingly, it is most apt to be successful in situations in which the return on capital constitutes a relatively small fraction of total economic

cost and in which differences in capital intensity as between producers are slight. These conditions are (approximately) met in the two industries (trucking and insurance) in which such systems of regulation have been employed for prolonged periods. In a capital-intensive industry, such as housing, differences in intensity are significant and need to be recognized.

An analysis of incentive effects of profit margin regulation suggests that a profit maximizing firm operating under a profit-margin constraint will increase its labour-capital ratio above the cost-minimizing level. In effect, each addition to labour costs carries with it an increase in permitted profits because the markup is applied to operating expenses (largely labour). As a consequence, the greater the labour input, the less serious the constraint becomes. A formal analysis of the constrained maximizing decision in the margin-control case will be found in Appendix 2-1. The extent of the distortion is greatest in capital intensive industries.

Margin-control systems have been used over several decades in the regulation of fire and casualty insurance at the state level in the U.S. and in the regulation of trucking, both in Canada and the U.S.

Fire and casualty insurance in most parts of the world is sold on a prepaid premium basis under which the insured pays a premium in advance, which is used by the insurer to meet claims and cover operating expenses. The capital of the insurance company, as distinct from the funds provided by its customers, is needed only to provide a safety margin and a backup in case claims exceed expectations. This is not an infrequent occurrence in this industry where actuarial techniques have only limited predictive power. The ability to continue in business is

limited predictive power. The ability to continue in business is dependent on the adequacy of premiums collected to meet claims and expenses. One company's loss experience is distinctly inferior for statistical purposes to the pooled experience of a number, and companies long ago joined together in rating bureaus which analyzed pooled loss experience and set rates for their members long before regulation by the state came into being. Regulation in a number of states was introduced to protect the public from fly-by-night operations which collected premiums and left town. Regulators were (perhaps too) easily persuaded by the respectable insurance companies that charging rates below those set by rating bureaus was a threat to the solvency of the entire industry. Regulations forcing insurers to belong to rating bureaus and to adhere to the rates set by those bureaus ensued. In most instances, rate regulation by the state did little more than validate the rates set by the bureau. Rating bureaus were universal, but regulation was not until a Supreme Court decision found insurance to be "commerce" within the meaning of the Sherman Act, and rating bureau activities of doubtful legality. [U.S. v. South Eastern Underwriters Association 322. U.S. 533 (1944)]. The Congress passed legislation exempting insurance from antitrust laws where it was regulated by the states. Where there was no legislation, insurance companies lobbied for its passage, and state regulation was established to protect the public by keeping antitrust at bay.

State regulation of insurance rates was primarily directed at ensuring that rates were equal to or greater than the rates promulgated by the rating bureaus. It was thus minimum price, and not maximum price regulation, and as such is of limited interest to us. Some exceptions from fixed minimum prices were provided. These were exploited by new entrants to the industry who cut prices and were thus able to capture significant market shares. By the late 1960's, regulation remained on the books but the essential characteristics of the market were such that the impact of regulation on rates was perhaps best described as minimal, with competitive forces in the industry operating more or less in the manner suggested by the competitive model, though vestiges of regulation, and pockets of excess profitability attributable to regulation, remained [Joskow (1973), MacAvoy (1977)]. In Canada, where bureau rate-fixing had never received overt regulatory assistance and support, the competitive character of the industry was still more in evidence. [Quirin and Waters (1974)].

Fire and casualty insurance differs markedly from housing in terms of the immobility of the capital employed. When reinsurance markets are operating properly, an insurer can move his resources out of one market and into another in days. But it is similar to

housing in another structural dimension; it is populated by a large number of firms and is relatively unconcentrated. It is this characteristic that maintained competitive pressures on the market and eventually made regulation irrelevant. Where physical capital is immobile, the existing stock of physical capital is of course hostage to regulation, but regulation is irrelevant to mobile capital which can simply go somewhere else.

Controls on trucking, like those on insurance, seem to have been imposed as the result of initiative taken by the industry itself, (and its major competitors, the railroads) rather than in response to any perceived damage to or complaints from, shipper interests. Indeed, in the U.S., the I.C.C. seems to have been handed control over interstate trucking primarily because of a perceived gap in the regulatory edifice being constructed in the 1930's. Belief in the efficacy of regulation persisted and regulation was imposed on those sectors to which it could be made to stick. At least initially, the attempt was made to impose minimum prices, to aid "recovery;" some degree of ambivalence with respect to whether prices were to be minimum or maximum seems to have persisted until the coming of deregulation in 1980. Such Canadian controls as exist seem to have been imposed because the truckers wanted them.

Trucking regulation involves not only price controls but controls over entry. Highway common carriers were required to obtain certificates of convenience and necessity authorizing them to serve specific routes. Existing carriers were granted "grandfather" rights, and certified by the I.C.C. In the U.S., no new firms entered the industry except by purchase of existing firms and their certificates, from the inception of regulation until deregulation in the 1980's, because no new certificates were granted. In Canada, certification is required by the relevant provincial agencies, and is somewhat easier to obtain.

Common carriers were obliged to become members of rating bureaus and to adhere to bureau rates. While overall margins were set, (until the mid-1970's when a form of rate of return regulation was adopted) actual rate structures closely paralleled those of the railroads; truck lines competed on the basis of service rather than price. The simultaneous constraints of prices equal to railroads and operating ratios at a target level were achieved largely by adjusting output mix. Trucks are cheaper than rail on short hauls, up to about 300 miles, but more expensive on longer hauls. Excess earnings on short-haul trucking were used to cross-subsidize long-haul movements and to achieve the desired operating ratios. Trucks captured a large fraction of the intercity freight market, in part because of their superior service, in part because regulation-induced excess earnings on short-haul movements enabled cross-subsidization of long hauls.

Certain categories of trucking were unregulated in the U.S., including carriers of agricultural products, contract carriers carrying one to seven shippers' goods under contract, and shippers' own trucks.

The latter was the most rapidly growing sector of the trucking industry, since use of owned trucks permitted carriage at long-run marginal cost, or only slightly above it since owners were not allowed to carry back-haul cargoes.

Rate control on trucking in the U.S. has been characterized by one student of transportation as follows:

> ....The ICC's rate policy (1) denied the shopper the advantages of the lowest-cost-transportation by rail, (2) diverted resources toward the high cost carrier, (3) added capacity to the nonrailroad sector of transportation at a time when the railroads had substantial excess capacity, and (4) encouraged the growth of private truckers as a way for a shipper of higher rate commodities to escape the consequences of value-of-service rate-making.
>
> (Peck (1970), p. 78)

Trucking regulation in Canada has not been as carefully studied as in the U.S., and the industry here is regulated at the provincial level though regulation is patterned on the U.S. model. There is no reason, however, to believe that the situation is appreciably different from that which existed in the U.S. prior to deregulation.

As alluded to earlier the U.S. trucking industry was deregulated in 1980. Since decontrol, rates have dropped 18-20% on average, up to 40% in some instances. [Labich (1985)]. Unlike oil and gas, there was no upward price movement initially.

(ii) Anti-Inflation Program

An example of margin controls being used in a less ambiguous context, albeit for a shorter period, is provided by the price control segment of the 1976-1981 Anti-Inflation Program. The objective was to slow down the rate of price increases, primarily as a means of making the wage control part of the program politically acceptable. Our interest

here is not in the success or failure of the program in the larger macro-economic context but on the working of the control system at the level of the firm and the industry.

The operative legislation, the Anti-Inflation Act of 1975 was largely inspired by the works of J.K. Galbraith [Galbraith (1951) (1967)] whose works are in turn the reflection of empirical research done by Gardiner Means [Means (1939)(1964)]. The basic tenet of the Means-Galibraith theory is that industrial prices are "administered" or set by large firms without regard for the market, and that such firms possess enough market power to make their prices stick and to induce consumers to buy enough of their product to realize the companies' forecasts. Control over wages and the bulk of prices was vested in the Anti-Inflation Board. Its jurisdiction was initially confined to firms with over 500 employees; exceptions were later made to include smaller firms in insurance, and the federal controls program was complemented by rent controls imposed by the individual provinces. This episode is the source of the rent control systems which remain in effect 10 years later (and 7 years after the demise of the A.I.B.) in most of the provinces. The following discussion relates to industrial prices, not rents.

Control over prices was imposed at the level of the company, and not over individual prices as such, which firms were free to vary as long as profit margins (before deduction of financing costs) were held to or below required levels. Firms were given a choice of base period for the computation of allowable margins, the 1970-74 average or the single year 1975, and were held to 95% of base period margins. This was relatively generous and compliance was not onerous except for those few firms

which had minimal profits or even losses in both periods. For these, provision was made for "low base period relief," which permitted earning of 8% on capital employed. Given the level of interest rates and inflation rates, 8% on capital was a decidedly harsher standard than that available to those industrial segments which had normal earnings in 1970-74 or 1975. The only major industry afflicted was fire and casualty insurance, whose problems were compounded by the fact that premiums set using actuarial predictions of loss experience, to comply with the low margin relief standard, turned out in the event to generate profits well in excess of the standard owing to a drop in claims, possibly the result of reduced automobile usage. This provided a set of scapegoats who could be accused of profiteering and evasion of the control system even though their profits, as a percentage of capital employed, were below those in many sectors which were in full compliance.

Except for the firms which were caught by the grossly-inadequate provisions for low-base-period relief, which provided perhaps 60% of normal profit levels, the restrictions were not particularly onerous -- given the choice of base periods, the 95% limits, the freedom to change individual prices and the reasonably short time the controls were in effect. The important function of the price system, that of providing signals by way of relative price changes, was little inhibited by the experience, over the three-year period. Over a longer period, when larger changes in relative prices might be expected to ensue, such a system might be more restrictive in this respect, and the experience should not be taken as indicative of likely experiences under similar general controls applied on a permanent or semi-permanent basis or to a single industry. What the experience does show is that the arbitrary imposition of

base-period margins as the standard may be grossly unfair to any industry whose profit cycle is out-of-phase with that of industry generally, as was the case with insurance. Controls for individual industries should be set with regard to what is normal for that industry, rather than for some arbitrarily chosen base period, if they are not to result in inadequate returns on capital employed.

During the A.I.B. period, there was some evidence of firms keeping up expenses in order to avoid the necessity to cut prices; this is of course precisely the form of distorted resource use likely to result when such a system is employed, as the analysis in Appendix 2-1 suggests.

Where production processes are capital intensive, operating profit margins must be (relatively) high to compensate for the lower capital turnover. Where capital is fixed and immobile, rather dramatic decreases in margins can be tolerated in the short run, without serious reductions in supply resulting; whereas where capital is mobile, minor reductions in margins may cause a major drop in supply.

In the rent control situation, low outward mobility is such that a wide range of margins can be absorbed without harm for a short period. Margin controls in this context, however, if structured to allow an adequate return on average capital intensity and imposed on an industry-wide basis, deny an adequate return on investment to those properties with above-average capital intensity while providing much higher rates of return to below-average capital intensity units. They thus create, in addition to the incentive to increase operating expenses, an incentive to reduce capital intensity. Some reduction in capital intensity comes about in the ordinary course of business as depreciation accrues. In the rental property context, under freely functioning markets it will

often pay to reinvest the depreciation accruals by renovating the property. Given the opportunity of improving rates of return by not renovating, premature deterioration is likely to ensue. It should be noted, however, that undermaintenance is apt to backfire, as it reduces the operating expense base to which the markup is applied. While margin controls offer the prospect of a relatively simple system, it is one in which the prospective distortions and constraints likely to be created in the housing market are severe.

As far as the resale market is concerned, margin controls would fix values at the appropriately capitalized value of the margin generated by the profit maximizing (but socially excessive, see Appendix 2-1) level of expenses. Such controls are likely, in our view, to induce landlords to incur excessive operating expenses, in order to boost dollar margins, to permit resale at higher prices. This is not a particularly desirable form of response, and margin controls cannot be recommended as an appropriate system for controlling rents.

It is possible to fix absolute margins, but not percentage margins. While this would still provide an incentive to withdraw capital, it would remove the incentive to gold-plate expenses. However, the administrative problems involved in setting absolute margins in an industry with thousands of participants are such that the percentage margin version has obvious attractions.

(c) Cost-of-Service Regulation

(i) Introduction

Cost-of-service regulation is sometimes referred to as rate base-rate of return regulation because its distinguishing feature is an allowance for return on investment which is computed in a way that

gives explicit considerations to the amount of capital employed (the rate base) as well as the cost of raising or retaining it (the rate of return). Operating expenses, or those operating expenses deemed by the regulatory agency to have been appropriately incurred in the production of the service, are of course also included in computing the cost of service which is recoverable via charges on users of the service. Cost-of-service regulation was developed in the 19th century and has been applied, with varying degrees of success, to water, gas, electric power, telephone and telegraph service as well as to rail and air transportation enterprises for long periods of time, in some cases 100 years or more. A tendency of other regulatory systems to evolve toward this form was noted. The most conspicuous recent example is U.S. trucking which switched from margin controls to rate-of-return controls shortly before the advent of deregulation, [with little or no observable impact except to remove an incentive to incur excessive wage costs, see Breyer (1982), p. 231].

While any form of regulation is capable of depriving a regulated industry of access to capital for expension, this form can enable the regulated enterprise to attract capital on a continuing basis, while providing returns no greater than necessary to attract capital. This is the limit to which the principle of consumer protection can be pushed; if returns are held below this level, the industry will lose capital and create a regulation-induced disaster. The rate of return required for capital attraction varies with capital market conditions; 30-day commercial paper rates have been as low as 3.33% (March 1971) and as high as 22.10% (August 1981) within the last 15 years [MacLeod Young Weir (1983) Table 1].

Obviously, a yield which was excessive at the former date could well have been grossly inadequate by the latter. The higher of these rates coincided with a crunch on credit markets that created severe hardships for landlords as well as for homeowners forced to renew mortgages near the peak. While it is important that allowed yields track the market, and offer yields comparable to competing uses of liquid funds, it is important that it be seen to do so, and that a mechanism for seeing that it will continue to do so in the future be seen to be in place. While it is technically true that only future investors need to be attracted, investment decisions are based on confidence in the future, and the best evidence of how future investors will be treated, once they have sunk their money into bricks and mortar, is how their predecessors have been treated. A stable mechanism for ensuring continued fair treatment will have more credibility than ad hoc adjustment, even if the latter is fair.

Other forms of regulation which impose maximum prices simply have not demonstrated this capability. It is, of course, not a problem in minimum-price regulatory systems.

There are several dozen systems of this type operated in North America by an equally large number of state, provincial and federal agencies. These systems differ in detail but are sufficiently alike to be considered as a type of regulatory system. The most significant differences between systems are those which relate to how the rate base is determined, both in terms of what is included or excluded, and in terms of how the included items are valued.

(ii) Rate Base Definition

Most jurisdictions employ a net asset rate base, usually one in which fixed assets employed in providing the service, plus an allowance for working capital, constitute the rate base. Note that if the usual accounting definition of working capital as current assets less current liabilities is employed, and if all fixed assets are included in the rate base, and measured at book value, the amount so determined is equal to the sums of long term debt, deferred taxes, preference stock plus common shareholders' equity, i.e., to capital employed as measured on the right-hand side of the balance sheet.

This equality follows from the fundamental accounting identity, which in terms of the account categories shown in Figure 2-1 may be expressed as

$$A_1 + A_2 + A_3 \equiv B_1 + B_2 + B_3 + B_4 + B_5 \qquad (1)$$

To derive the net assets plus working capital base on the left, deduct B_1 from both sides, leaving

$$(A_1 - B_1) + A_2 + A_3 = B_2 + B_3 + B_4 + B_5 \qquad (2)$$

which is the relationship noted above.

FIGURE 2-1

Balance Sheet Items Used in Alternative Rate Base Concepts

Assets		Liabilities, etc.	
A_1	Current assets	B_1	Current liabilities
	Net fixed assets:	B_2	Long term debt
A_2	In use	B_3	Deferred taxes
A_3	Under Construction	B_4	Preferred stock
		B_5	Common Shareholders' equity
	Total Assets		Total Liabilities and Equities

Despite the conceptual simplicity of using the right hand side of expression (2) as the rate base, the only agencies known to have adopted it are the Massachusetts Commission and the former Canadian Board of Transport Commissioners; it has remained in limited use by the successors to the latter body.

Most regulatory agencies have instead chosen to work from the asset side of the balance sheet instead of from a capitalization measure. Historically, this reflected a desire to avoid allowing excessive returns on "watered" stock, a fairly common pre-1933 phenomenon in which stock is issued, usually to promoters, for little or no consideration, but recorded on the company's books at par value. Use of an asset-based rate base simplified the elimination of such fictitious values from the rate base.

(iii) Construction Work In Progress (CWIP)

Many of the regulatory agencies using net asset rate bases have excluded net fixed assets under construction, usually labelled as Construction Work In Progress (CWIP), from the rate base. A return is provided on these assets by charging a portion of interest paid to the construction accounts, increasing earnings after interest by an equivalent amount. The amount of interest thus diverted from interest expense and capitalized is referred to as Allowance for Funds Used During Construction (AFUDC), and is usually computed at a rate equivalent to the rate of return allowed on rate base, with certain tax adjustments, so that the regulated firm is able to realize its allowed rate of return on the sum of rate base plus CWIP. Despite this, exclusion of CWIP from the rate base has become controversial because of its effect on what financial analysts refer to as "quality of earnings." Unlike normal earnings, the earnings represented are not realized through the sale of the service to customers in an arms'-length transaction, the usual point at which accountants consider earnings to be realized. They represent instead book entries, which will be recovered as cash, if at all, out of earned depreciation on the properties to which they relate. Ordinary sales and earnings represent cash inflows, AFUDC earnings do not. If anything, they are the opposite, a cash outlay (interest) which is ignored in computing earnings.

Capitalization of AFUDC, and the exclusion of CWIP from the rate base were adopted in most jurisdictions as a means of ensuring that the costs of constructing and using an asset are recovered from those customers who actually use the services produced by the asset.

Inclusion of CWIP in the rate base would, it is argued, force present customers to pay for facilities which are of benefit to future customers only. CWIP is normally a small fraction of total assets; most utilities experience growth in physical volume of 10% or less, and could, in a stable environment make the investment to serve this expanded market with a corresponding fraction of assets invested in CWIP.

When new capacity costing 3 times as much as existing capacity, and more, was added during the 1970's, the quality of earnings issue assumed significant proportions, in part because allowable earnings were inadequate or barely adequate. A number of regulatory agencies chose to abandon their concern for intergenerational equity or to rethink it, and began to include CWIP in rate bases. Our impression is that a number did so as an alternative to allowing allowed rates of return fully to reflect all-time highs in the nominal cost of funds.

CWIP is the major item excluded from rate bases; most commissions have the power to exclude assets which are not "used and useful" or "used or useful" in providing service to the public. The technical reason for excluding CWIP is that the assets it represents are not in use. Other assets in these categories, e.g., investments in unregulated businesses, may be, and regularly are, excluded if it is the commission's view that customers should not have to pay for them.

Under the present Ontario system of rent review, interest paid on capital expenditures for renovation or maintenance is excluded from recoverable financing costs; a procedure which is the operational equivalent of excluding CWIP from the rate base. However, there is no mechanism for capitalizing these expenditures to be recovered later, perhaps because of the rudimentary recognition given capital costs in the system.

(iv) Working Capital

The other item in which major changes are made is working capital. Accounting working capital has been defined as $A_1 - B_1$ above. Where accounting working capital is used, and CWIP excluded, the rate base is $A_1 - B_1 + A_2$. During the 1930's, investment requirements of utilities were low, because of low market growth, and many utilities became more and more liquid as earnings piled up, neither distributed nor reinvested in fixed assets. Many utilities had, as a consequence, working capital that was excessive by any standard. Many commissions responded to this problem by finding portions of the working capital neither used nor useful. Sums in excess of the amount found necessary were excluded and no return allowed on them. Necessary working capital was measured either by an arbitrary formula linking required working capital to operating expenses (formula working capital) or by excess of a study which traced the lags between expenditures on expense items and their recovery from customers (known as a lead-lag study).

While formula working capital was initially less than actual accounting working capital, and was adopted to spare customers from having to support excessive working capital, by the 1970's, most utilities had learned how to get along with less working capital than provided by the formula, and in fact with zero or even negative working capital. As a consequence, the continued use of formula working capital, with unchanged formulas, meant that customers were paying for working capital that did not exist. It should be noted that

both the excessive working capital of the 1930's and the negative working capital found during the 1970's represent the effect of incentives created by the regulatory system, in the first instance to "gold plate" and increase the rate base, in the second to economize on working capital. The matter of incentives is further examined in Appendices 2-1 and 2-2.

There is, of course, no rate base in the current Ontario system of rent review, nor is any explicit consideration given to the landlord's need for working capital. This should be minimal as rents are ordinarily payable in advance; further working capital is provided by the last months' rent deposit allowed and customarily required. In our view no further provision for working capital would be necessary if a cost-of-service regulatory model were chosen.

(v) Rate Base Valuation

How the rate base is to be valued, as distinct from what is to be included in it, was more of an issue prior to 1945 than it has been since. A number of conceptually-distinct alternatives exist; when potential combinations of these are considered an infinity of practical alternatives are available. However, it makes sense to focus on the small number of discrete alternatives which bound the set of alternatives. Valuation systems which have been used include the following:

(1) Original (Historical) Cost

(i) to present owner,
(ii) to initial owner,
less depreciation

(2) Adjusted (Trended) Original Cost

(i) to present owner,
(ii) to initial owner,
less depreciation

(3) Replacement Cost

(i) less book depreciation,
(ii) less observed depreciation

(4) Market Value

(5) Fair Value

(6) Undepreciated versions of (3),(4) and (5)

(7) Par Value of outstanding securities

(8) Book Values of outstanding securities

The descriptive labels attached to versions (1) - (5) describe, in most cases, the methods used to attach values to the fixed assets which comprise the net plant accounts. Current assets and liabilities are usually taken at book value, which is ordinarily the equivalent of acquisition cost and of replacement cost except for any allowances for doubtful accounts receivable and, perhaps, for obsolescent or obsolete inventory. It is however, possible, and quite in keeping with the underlying rationale of the trended cost model, to restate current assets and liabilities to reflect current-value equivalents of the sums originally expended to acquire these assets. Valuation problems in respect of current assets and liabilities are restricted to cash items, receivables and liabilities; book values of inventories recorded on a first-in-first-out (FIFO) basis will tend to approximate current values

if there is reasonable turnover in the inventory account. Of course, if formula working capital is employed, an implicit adjustment to current values is provided by the link to operating expenses.

Choice of a valuation method per se is relatively unimportant as long as a rate of return appropriate to the choice of rate base is selected. If an inappropriate combination is used, failure to attract capital, excessive prices, or distorted input choices can result. Some combinations also have the ability to generate disagreement and excessive regulatory and compliance costs, an important consideration.

(vi) Original Cost

Original cost, version (ii), original cost to the first owner, or when first devoted to the public service, is by far the most widely used valuation method today. This version is sometimes referred to as "aboriginal" cost to distinguish it from version (i). Version (i) is the simplest to apply in practise, since the values used are those recorded in the company's accounts, which are kept on an historical cost basis. The "aboriginal cost" alternative is used in most jurisdictions because of the possibility that assets could be transferred between a succession of owners, at ever-increasing prices, at least until the escalation in customer rates brought about by the higher rate base values reached its natural stopping point, the unregulated monopoly price. Beyond that point, while regulatory bodies may allow rate increases, customer resistance (or demand elasticity) will be so high that further increases would reduce profits rather than increasing them.

While this provides a powerful argument against the use of unqualified original cost to the present owner, many jurisdictions experienced considerable difficulty, at least initially, in applying the "aboriginal" alternative. Finding out just what the original owner paid was often impossible, usually because previous owners' records had disappeared and were not available to the regulatory body, to the present owners, or to anyone. As a consequence, many gave up and used original cost to the present owner. The problem is one that is peculiar to the start-up phase of a regulatory system. Once regulation has been in effect for some time, asset structure will come to consist largely of properties initially acquired by the regulated owners. Regulatory bodies' records, coupled with their control over the sale of utility assets, should be sufficient to prevent any abuse in this direction, as they can refuse to permit asset values to be written up by new owners to reflect acquisition costs. That power alone should discourage a buyer from paying significantly in excess of original cost to their present owners. We note, however, that in recent takeovers affecting Canadian Utilities Ltd., TransAlta Utilities, and Union Enterprises, cost to the acquiring company was significantly in excess of asset values thus defined. No adjustments were made on the books of the regulated subsidiaries, however. Once the difficulties of the start-up period are past, the regulatory body's own records, plus its control over accounting practises of companies under its jurisdiction make version (ii) almost as simple to apply as version (i).

A basic objection often raised to version (ii) is that it does not permit a buyer paying more than the book value of a property to its

present owner to recover the full purchase price or a return thereon. This is not only true; it is the purpose of version (ii).

A similar but unrelated objection to both versions (i) and (ii) is that no account is taken of inflation. While we do not dispute the need for any system to permit the unregulated enterprise to attract capital under inflationary conditions, it is a mistake to infer that this can only be done by adjusting the rate base. Response to inflation is the result of the entire system, involving rate of return as well as rate base values, and cannot be inferred from rate base treatment alone. This is, however, a critical issue to which we shall return below.

In the rental housing context, the regulatory system is in that transitional state in which there is a significant difference between the two choices, and will be for a generation or more. There are obvious problems in applying an aboriginal cost standard in that records will often be inadequate. Land transfer tax records are available but are suspect because of the obvious incentives to evade the tax; in any event they provide no information on additions or betterments made by successive owners, a critical factor if the method is to be workable. On the other hand, use of version (i) original cost to the present owner creates an incentive to "flip" properties at escalating prices. On the other hand there is no reason why owners who acquired properties from others at market prices before regulation commenced, (or perhaps even under conditions permissible under earlier regulations) should be denied a return on what may be a major fraction of their investment. Adopting this standard creates transitional problems in that the buyer who bought in 1974 would be allowed a fair return on the 1974 value, while one who acquired the property in 1954 would only get a return on

the 1954 value. These problems are inherent in any original cost scheme; they can of course be avoided but only by adopting some alternative valuation scheme, e.g., by allowing both a return based on the 1974 value.

As far as the ability of a system using an original cost rate base to continue to attract capital during inflation is concerned, we anticipate part of our discussion of required rates of return by noting that proper use of an original cost rate base, as ordinarily applied, means that the common stock of the company will trade in a range which approximates book value per share, so that the stock resembles a floating-interest rate perpetual bond. Such a security does not provide principal-value protection against inflation. It does, however, provide dividend yields which increase, during inflationary periods, to a level which reflects the anticipated purchasing power loss on the initial investment. This system may fail to provide adequate compensation for purchasing power losses because dividends are taxable, but so are capital gains and much the same objection might be raised to an alternative structure which provided an equivalent inflation adjustment in the form of asset value changes rather than changes in yields. To the extent that the tax system creates problems, it does so for the full spectrum of assets, not just for claims against regulated companies, and it is preferable to amend the tax system rather than to design a regulatory system which overcompensates in order to overcome the biases of the tax system. In any event, there is reason to believe that required yields reflect not only anticipated inflation but existing tax structure as well. [Amoako-Adu (1981), Miller (1977)]. To the extent that

they do so, providing further compensation through the regulatory system would only overcompensate. We note, however, that original cost systems, by forcing adjustment onto the yield side of the system, can compensate only for inflation which is anticipated in the capital market. Systems which compensate on the rate base side can compensate for all inflation experienced, unanticipated as well as anticipated. They thus relieve the investor of the risk of loss or gain due to unanticipated variation in the inflation rate and should lower the real yield required to compensate for risk. The risk does not disappear; it is simply shifted to customers, some of whom may be better able to bear it than investors, while some will doubtless be less able to do so. To a considerable extent the choice of a regulatory system is a choice about who is to benefit from, and who is to suffer from inflation.

(vii) Trended Cost

Adjusted or trended Original Cost [Alternative (2)] is perhaps the simplest system which compensates for the effects of inflation by adjusting the rate base rather than the yield. As the name suggests, trended cost rate bases are rate bases in which assets are revalued by applying index numbers to original acquisition costs or assets, restating then on a current dollar basis to reflect losses (or gains) in purchasing power since the date of acquisition. Similar adjustments are made to depreciation charges and reserves.

In addition to the versions identified above as using cost to the present versus the original owner, and which may be much less significant if both are changed into current dollars, it is possible to distinguish two variants of each, one of which uses indices of general

purchasing power to make the adjustment while the other uses indices of replacement costs for individual asset classes. The latter may be viewed as a relatively simplified version of a replacement cost rate base. While it is one which is free of many of the objections to replacement cost rate bases that are outlined below, it will be discussed as a subcase of the latter. The present discussion will be confined to the version adjusted for general purchasing power changes. To the extent that investors need inflation protection, it is against such changes, and not against changes in the values of individual assets, that protection is required.

It was noted above that investors were able to protect themselves against anticipated inflation under any rate base valuation scheme, but that protection against unanticipated inflation can only be provided in a system which adjusts for all the inflation that has taken place after the fact. Trended cost is, of course, such a system, and in doing so it shifts the risk of unanticipated inflation from the investor to the customer. The pattern of increased prices which emerges as a consequence of anticipated inflation under an original cost system is quite different from that which emerges under a trended cost system, because in the former case the adjustment must perforce be made in the rate of return, since the rate base is not adjusted. Consider a regulated firm, operating in an inflation-free environment with a rate base of $1 million and an allowed rate of return, set equal to its cost of capital, of 8%. It is also assumed that the firm is financed with common stock only. In the inflation-free environment, the return on investment component of its cost of service will be $80,000 annually.

Now assume that inflation is anticipated at an annual rate of 10%. If the firm is regulated on an original cost basis, investors will increase their required nominal rate of return from 8% to 18%, to compensate for the shrinkage in real value of their shares which will (for reasons to be outlined below) continue to sell at book value. The consequence is an immediate jump in the return on investment component of its cost of service to $180,000. On the other hand, if the firm is regulated on a trended cost basis, investors know that the value of their shares will increase by 10% each year, as inflation proceeds, so that their required nominal return, which is 18% as it is in the original cost case, is achieved in two parts, as follows:

Allowed return	80,000	
Nominal Capital Appreciation	100,000	(at year end)
	180,000	

In the second year, the annual allowed return will be $88,000, reflecting the 10% increase in the value of the rate base which took place at the end of year 1. The resulting sequence of the return on investment component in the cost of service under the two methods of valuation will be as shown in Table 2-1. This suggests that under trended cost valuation, the return component will grow annually by a percentage equal to the inflation rate, whereas, if inflation is anticipated, the required return component under original cost valuation will jump initially by an amount which compensates for inflation all

TABLE 2-1

Required Return on Investment Component
Cost of Service

Year	Original Cost vs Trended Cost (10% Inflation, 8% Real Return) Original Cost	Trended Cost
0	80,000	80,000
1	180,000	80,000
2	180,000	88,000
3	180,000	96,800
4	180,000	106,480
5	180,000	117,128

Assumes: inflation anticipated
no taxes.

at once. In effect, original cost provides compensation for anticipated inflation as a lump sum payment in the year in which inflation occurs, while trended cost provides compensation for inflation in the form of an annuity which increases all subsequent income flows by a percentage equivalent to the rate of inflation. Perhaps paradoxically, original cost valuation, by holding asset values down, requires a larger rate increase to compensate for anticipated inflation than that which is required in the trended cost case.

In the real world, this simple story is complicated by the fact that inflation may be unexpected, in which case no increase will be required in the original cost case, or it may be expected but fail to materialize, in which case an increase will be required in the original cost case but not in the trended cost case. A further complication is posed by the existence of taxes; investors will augment their return requirements by more than the anticipated rate of inflation in

order to preserve the after-tax real income. A differential may emerge depending on whether the tax rates on dividends (in the original cost case) and on capital gains (in the trended cost case) are the same.

We have shown the responses of the two systems to increases in the inflation rate. Reductions in the inflation rate have similar impacts, in reverse of course. If the inflation rate drops to zero and the required nominal rate of return to 8%, the required return on the original cost property will drop to $8,000, that on the trended cost property will climb to $128,841 (reflecting retrospectively the 10% inflation that took place in the fifth year) and stay there. But, it should be noted, this represents no increase in real rents from what was paid in year 0, since price levels (and presumably wages) have risen. The customers of the original-cost-regulated supplier, on the other hand, get a reduction in real cost below that initially paid, and indeed they should for they have returned a significant fraction of the capital invested by the supplier in the form of the exceptionally high "return on investment" provided to meet prevailing yields during the inflationary period. Note, however, that a major regulatory initiative may be needed to force prices down in the post-inflationary period in the original cost case. If there is limited competition and excess demand, neither unusual in a regulated setting, they will not go down by themselves.

While trended cost thus, in our view, provides a means of compensating investors in a regulated enterprise for inflation which is less disruptive, in terms of generating large price increases, than original cost, a practical complication arises because of the fact that significant positions of assets in such enterprises are financed with debt,

preference stock, or, in the rental property case, mortgages. These types of obligations require an annual payment which is fixed in nominal dollars. Investors in these types of securities protect themselves against anticipated inflation by demanding a higher rate of return, which compensates for the loss in purchasing power of their capital. If these rates of return are used in setting the allowed return component in a trended-cost system, there will be double compensation for that portion of the assets that are so financed. This could be handled by holding the rate of return down to a level that corresponds to the real cost of capital and excludes any compensation for inflation on the return side. Doing so would require that common shareholders make up bondholders' additional return requirements, at least temporarily, out of their share of the allowed return. This would create major financing problems, because interest coverages would be adversely affected, and should be avoided for that reason. Instead, so-called "split-inventory" systems can be used, in which the portion of the rate base financed by debt, preference shares, or deferred taxes is valued on an original cost basis and trending is confined to the residual equity portion. Even this approach can create problems, because the common equity portion of the return, which is the portion that provides the safety margin of coverage for fixed charges on senior securities, does not grow as fast as the fixed charges. In practise a split-inventory system can create additional headaches, since portions of the rate base will jump back and forth from on valuation base to another as earnings are reinvested, as debt is amortized and as new securities are issued.

In the limit, as debt (or preferred) financing approaches 100%, a split inventory system becomes virtually identical to a pure original cost system, while as it approaches zero, it becomes a trended cost system. It is perhaps these complications, as much as anything else which have discouraged the wide use of trended cost as a valuation method.

However, we note that such a system may have its uses in the rental market. While debt costs are high, it is necessary, for practical reasons associated with servicing the debt, to allow earnings reflecting current yields, which is most economically done on an original cost base. As debt is retired, trended cost treatment of the equity may be more appropriate both in terms of fair treatment for the landlord and for the tenant. As such it deserves careful consideration.

(viii) Reproduction Cost

Reproduction cost valuation, like trended cost, provides a rate base which reflects the effect of inflation. Instead of protecting the investor's purchasing power, which is the intent of the usual trended cost approach, this method does not look beyond the corporate veil, but seeks to preserve the real value of the capital used by the corporation. While reproduction cost values can be derived in much the same way as trended cost values, by using index numbers, the method is usually associated with engineering valuation studies which seek to estimate the cost of reproducing the regulated company's plant at current prices. There is a basic conceptual problem with the approach, and there have been no end of abuses associated with its use in concrete situations.

The basic conceptual flaw is that the method takes no account of technical progress. Were the company to replace its plant tomorrow, it would not do so item by item but would use more up-to-date components, in a rationalized configuration providing the most efficient means of serving the existing market. The likelihood is that such a system, constructed de novo, would be appreciably less costly than the reproduction of the existing system. While there is a rationale for preservation of the purchasing power committed to the existing plant, and which leads to the trended cost model discussed above, there is no particular rationale for the freezing of technology which is implicit in the reproduction cost approach.

The failure to track technical progress appears, at first glance, to be of less significance in housing than elsewhere, since basic structures change but little. But construction technology does change, driven at least in part by the need to use less labour-intensive methods as real wages rise. Use of reproduction cost implies incorporating the cost of replicating, using today's labour, expensive hand detailing found in older structures but uneconomic today, into the reproduction cost estimate.

In practise, the application of this valuation principle has been an invitation to the exercise of the valuer's imagination on behalf of his client. Mains laid under streets or lanes before paving took place were, typically, valued not at the current cost of laying comparable mains under unpaved streets or lanes, but at a unit cost that included the cost of cutting through pavement, laying the main, and replacing pavement. While such an estimate clearly reflects the cost of reproducing the plant under current conditions, no satisfactory

reason why customers should be charged for cutting and relaying of pavement which never took place has ever been provided. As most replacement cost studies are full of such phantom costs, replacement cost as a valuation method has been largely discredited for rate-making purposes, though it hangs on in the U.S. in the I.C.C. It is also used for other purposes; for example, in Alberta where utility plant is transferred to or from a municipal utility as the consequences of boundary changes, reproduction cost is the prescribed valuation method.

Replacement cost valuation was developed in U.S. regulatory practise in the 1890's, and at the instigation of representatives of consumer interests [notably William Jennings Bryan, appearing for Nebraska in Smyth v. Ames (196 U.S. 466 (1898))] who argued, that after a period of falling prices, consumers should not be made to pay rate bases on construction costs incurred at higher price levels. At the time it was opposed by the utilities and railroads to whom it was proposed to apply it. During the 1920's, prices rose sharply, putting shoes on the opposite feet, and utilities developed a sudden devotion to reproduction costs which reached almost unimaginable heights of inventiveness, [cf. McCardle v. Indianapolis Water Co. 272 U.S. 400 (1926)] while consumer spokesmen were developing a sudden affection for original cost. After 1929, the shoes were reversed once more.

Both original cost and reproduction cost evidence was routinely produced at U.S. regulatory proceedings from 1898 to the mid 1940's; during this period the courts would frequently intervene and overrule

the decisions of regulatory tribunals on the ground of confiscation and denial of due process if all of the bases mentioned in Smyth v. Ames were not touched. In Hope Natural Gas [320 U.S. 591, 51 PUR NS 193] in 1944, the Supreme Court shifted its emphasis from procedural due process to substantive, and indicated that end results, rather than how they were arrived at, were the critical criterion. Since that time, virtually all regulatory jurisdictions in the U.S. have adopted original cost valuation as the basis of their regulatory systems. The Hope decision was a vindication of Mr. Justice Brandeis, whose dissent in Southwestern Bell Telephone Co. v. Public Service Commission [261 U.S. 276 (1922)] is the classic statement of the case for original cost.

Because of the enormous costs involved in preparing reproduction cost estimates on a property-by-property basis, reproduction cost should not be considered a desirable, nor even an administratively feasible option in the rent control context. Any advantages it may have are captured using the trended cost approach. If desired the latter may be trended using replacement cost indices instead of general price level indices. While there may be some efficient-pricing arguments for such a choice, it is not clear why the purchasing power of capital invested should be preserved in terms of buildings in lieu of its purchasing power over commodities in general.

In reproduction cost studies, land is valued at current market value. This approach therefore gives better recognition to the alternative use of the land and to the need to respond to price signals reflecting the need to consider a change in use, i.e., increased density,

or even non-residential uses. This is perhaps the most valuable aspect or component of the reproduction cost model, but it can be obtained, in a split inventory context, without buying the rest of the reproduction cost methodology.

(ix) Fair Value

During the period from 1898 until the mid-1940's, while Smyth v. Ames was regarded as binding, the predominant form of rate base used in the U.S. was a so-called fair-value rate base, best defined as an average of original cost and reproduction cost rate bases, using such weights as appeared appropriate to the regulatory agency. As long as both were considered, the procedural demons of Smyth v. Ames could be exorcised. The last state to abandon fair value was Ohio, in the late 1970's, and fair value lives on, more or less, in the I.C.C. It is essentially irrelevant in the latter context as U.S. railroads have long demonstrated an inability to earn their allowed rates of return, no matter how calculated. The only meaningful area in which the I.C.C. used fair value was in regulating oil pipelines; these were switched to original cost when regulatory jurisdiction over them was transferred to FERC in the 1970's.

"Fair value" is not an independent valuation method, it is simply a description for a variety of methods which combine both original cost and reproduction cost in varying proportions. We note that such a combination may be not dissimilar from a split-inventory original cost/trended cost rate base.

Valuation systems discussed to this point are "net asset" systems, in which appropriate allowances for accrued depreciation are deducted from the basic asset values. In the original cost and trended

cost alternatives, depreciation charges and accrued depreciation are taken either as booked or as booked with an allowance for price level changes, respectively. In some cases, price-level-adjusted depreciation was also used in reproduction cost rate bases, but the usual valuation method involved the deduction of "observed" depreciation from the reproduction cost values. Faced with the opportunity, many valuers whose vision was unbounded when adjusting plant costs upward, developed acute myopia when it came to detecting any depreciation on well-maintained or even poorly-maintained plant. The magnitude of depreciation charges to be included in operating expenses were, of course, a quite different matter, and totally unrelated to valuation, as there was no insistence that the rate base be reconciled with the accounts.

It is important, in our view, that rents reflect the age and condition of the building; this requires, we believe, that one (or some combination) of the net asset rate base models be chosen; if depreciation accruals are reinvested, and the capital value maintained, there will, of course, be no reduction in allowable earnings. Otherwise there will, and should be. But see below.

(x) Undepreciated Rate Bases

The use of undepreciated asset rate bases is mentioned here not because there are any current examples of its use, (although the leading U.S. case on valuation, Smyth v. Ames [196 U.S. 466 (1898)] is quite confused as to whether depreciation should, or should not be deducted) but because it represents a set of alternatives which may be of practical use in some contexts. Depreciation accounting, although virtually universal today, is not the only method of handling the problem. Until well into the present century, a number of enterprises,

particularly utilities and railroads, practiced the alternative of retirement accounting, in which repairs, replacement and retirements were expensed, while only those capital expenditures which represented "betterments", i.e., expanded or improved capacity, were capitalized. Under certain conditions not found in rental housing (many small assets, uncertain lives) the income statements produced under retirement accounting and those produced under depreciation accounting tend to converge, but convergence is, in general, slow and uncertain.

It is not the (possible but unlikely) convergence of depreciation accounting and retirement accounting which leads to its consideration here, however. We consider it because of the regulatory problems of regulated companies at the opposite end of the spectrum, i.e., those with a single asset, "conservatively" depreciated. "Conservatism" in this context means depreciation over a period shorter than the useful life of the asset. Its consequence, of course, is that the book value of the asset, hence the largest component in the rate base, is reduced to zero while the asset is still in service. This problem is referred to in the Canadian regulatory literature as the "disappearing rate base" problem. This is, for obvious reasons, a problem which is of significant potential relevance for a rent control system which uses the individual building as the regulatory unit. As a practical matter, the problem has become of some relevance in the case of the Trans Mountain oil pipeline system, built in the 1950's and virtually never expanded. When the rate base disappears, what is an appropriate allowance for return on investment? Presumably, by this point, all indebtedness has been extinguished, or should have been if the lenders were realistic enough to impose appropriate sinking fund requirements. The answer yielded

by the conventional rate base-rate of return model is "none", since the undepreciated rate base has disappeared. But such a solution has obvious drawbacks from the point of view of preserving incentives to efficiency in terms of operating expenses. In effect, owners would receive "expenses plus nothing" and would have an incentive to increase those expenses which increase the value of the building, covering them out of increased rents, then to sell the building. Consideration of this problem suggests that a retirement accounting alternative, in which the rate base did not decline as long as the plant was usable, and in which no depreciation expense was allowed and in which the annual rate of return was altered in recognition of this rate base treatment, might well be worthy of consideration. What that rate of return might be, we leave for discussion below. While such a scheme represents a significant departure from the use of conventional accounting standards (or "generally-accepted accounting principles") we note the observation of one of the most distinguished students of the regulatory process: "any scheme of compensation is fair provided only that it was reasonably anticipated at the time of investment," [Lewis, (1940), p. 688] [emphasis supplied].

It is, of course, equally possible to avoid the negative consequences of the "disappearing rate base" problem with any linear combination of valuation methods (1) or (2), and an undepreciated version of the same. The characteristics of any such system will be somewhat between those of the two methods employed; these will be a correspondingly modified "correct" rate of return concept.

Overdepreciation poses a problem in the rent control context because the owner can fully depreciate the property recording depreciation

through rents, then sell it, in cases where excessive depreciation has been taken, for an amount in excess of the (still undepreciated) land value. The problem is confused somewhat by the fact that accounting depreciation computed on an original cost basis does not permit recovery of the real (price-level-adjusted) value of the capital employed, but it is fairly obvious that even where there is an unrecovered balance of investment in these terms, recoveries on sale may be well in excess of unrecovered net investment. The problem is one which can be solved by improving the depreciation estimates, and the remedy for excess depreciation, however it be defined, is not no depreciation at all. Ideally, recoveries on sale would, on average, equal real values of residual investment in the building plus current land value. Some will recover less, some more, and any over- or under-recovery on the building should be a windfall with an expected value of zero. This leaves any appreciation in the real value of the land in the hands of the landlord; proposals to confiscate this "unearned increment" take us back to the world of Henry George. Upon reflection, however, it seems clear that unearned increment accruing to tenants is as unfair as unearned increment accruing to the landlord. If it is to be confiscated, it should be confiscated via the tax system for the general benefit of the community, and not merely redistributed to existing tenants via rent controls. Accordingly we would leave the residual land values in the landlords' hands, so far as any rent control system is concerned.

(xi) Market Values

To this point we have discussed all the asset-value rate base valuation models except that of market values. Market values are among the relevant factors for consideration in the valuation process listed by the U.S. Supreme Court in Smyth v. Ames [196 U.S. 466 at 547 (1897)]. Despite that commendation, it is a criterion which no regulatory agency has been known to apply.

The reason is simple. The assets of conventional utilities (i.e., electric, gas, water, and telecommunications enterprises) are quite specialized. Except for interests in land, which are usually a small fraction of the total, and for a few multipurpose assets such as furniture and motor vehicles, most of the assets of a typical utility have no value except that derived from their role in the provision of utility services. That value, in turn, is best represented as the capitalized earning power of those assets in their present (utility) use. Since that value is so directly derived from allowed earnings, its admission to the regulatory process for the purpose of determining allowable earnings would introduce a degree of circularity to the process itself, in which regulation either confirmed the status quo or some quite arbitrary earnings level, totally unrelated to experience.

If we look at the residential housing market, however, these considerations, which led to the exclusion of market values from consideration in the traditional utility case, are largely absent. Land values are not an insignificant part of the asset base, and, to the extent they are determined by values in alternative uses, they have an objective quality that is totally absent in the traditional regulated-utility situation. Building values ordinarily represent a larger fraction of

total asset values committed by landlords to the rental housing market. Once again, however, these have values dependent on their value if sold for owner occupancy, whether as single family units or as condominiums. Providing there are no restrictions on the conversion of rental buildings to condominiums or the reclaiming of tenant occupied premises for occupation by the owner or a subsequent buyer, there may well be a market value for rental properties which is not directly derivative from the magnitude of its rent-roll. Under these circumstances, we suggest, market value, as determined in accessible markets for owner-occupied housing, forms one admissible method of rate base valuation, and conceivably one which could be used as the basis of a regulatory scheme. It should be noted, however, that where there are restrictions of any kind on the conversion of rental properties to condominium status, the result of such regulation will be to reduce market values to the extent that the whole process may well be inappropriate for reasons of circularity. On a more practical level, the determination of market values, whether for land alone or land and buildings, requires the use of appraisals and raises the problem of selection bias in the choice of appraisers. Theoretically, this could be solved by checking appraisals in-house, but that would be excessively expensive and might not solve the problem. Appraisers have been known to change employers. In general this is a solution which is more attractive theoretically than practically, and is probably better avoided.

(xii) Capitalization

Systems in which the rate base is derived from the outstanding capitalization are much less common than asset-based systems, although the use of outstanding capitalization provides, at least conceptually,

a more direct route to the determination of the return required to support that capitalization than does the use of an asset base. It appears from the historical record that most jurisdictions chose to use asset-value bases because of the prevalence of watered stock in regulated companies during the latter part of the 19th century. Only two jurisdictions used capitalization rate bases on a continuing basis. One is Massachusetts. The Massachusetts legislation, often cited as a model [Bauer (1926), Brandeis (1923), Ripley (1927), Barnes (1930)] gave the regulatory agency authority to regulate the issuance of securities by regulated companies. It was enabled thereby to prevent stock watering; the outstanding capitalization of utilities under its control represented funds actually and prudently invested in assets used to serve the public, all that remained was to ensure that earnings were no larger than necessary to support that capitalization.

The other jurisdiction using capitalization for the purpose of determining allowable earnings was the Canadian Board of Railway Commissioners, subsequently the Board of Transport Commission, which used its so-called "requirements formula" for railways, telegraph and telephone companies until control over the latter was transferred to the Canadian Radio and Telecommunications Commission (CRTC) in the 1970's. Under this method, the regulated enterprise was allowed earnings in an amount sufficient to cover interest on debt, dividends on preference stock and a "suitable" dividend on the common shares, together with a sum for earnings to be retained in the business [Purdy (1972)].

In practise the methodology used in determining the allowable sum of dividends plus reinvested earnings was similar to that used in determining common equity rates of return, which we discuss below.

Use of a capitalization rate base has created at least one controversy, between those who would determine allowable earnings with reference to the par value of outstanding securities and those who would determine it by using actual sums invested. Initially, proponents of par values were promoters seeking to justify returns on securities sold at significant discounts ("watered" stock). In more recent years, proponents have been consumer interests claiming that returns to common shareholders should be restricted to the par values or initial issue prices of common shares, on the claim that retained earnings were provided by the customers and that customers should not have to provide a return on funds they themselves have provided.

The weight of opinion favours prudent investment; should bonds have to be sold at a discount it is usually because the proffered interest rate is too low; while it may be preferable to issue bonds at par if only to avoid confusion, rates of return which take account of the discount, as discussed below, are appropriate in situations where they are not. These can be expressed as a rate of return on par or net book values of the bonds as dictated by regulatory convenience.

The argument with respect to retained earnings is frequently raised. It could as easily be raised (and has been) with respect to assets funded from accumulated depreciation. The point, however, is not where the retained earnings came from but who the constructive owners are. While the funds belong to the corporation itself, they would, on liquidation go to the common shareholders and they appear on the balance sheet as common shareholders' equity. It is difficult to view them as anything but beneficially owned by the common shareholders.

They acquired that status when first earned; they could have been distributed at that time, quite legally, to the common shareholders [except, perhaps, for restrictions in trust deeds relating to debt, intended to provide a margin of protection for creditors]. The decision to retain those earnings is a decision to increase the investment of common shareholders in the regulated enterprise, and the shareholders are as entitled to a return on that investment as they are on funds advanced earlier.

Similarly, investors in a building provide some funds themselves and assume liabilities to those who put up the balance. To the extent that earnings and depreciation accrue to the account of the owner, they constitute the return on (or of) his investment and are his property to do with as he pleases. If he chooses to use them to pay down the mortgage, (a choice to which he may commit himself in advance via an agreed-on amortization schedule) he has increased his investment in the building by the amounts so paid. The tenants have not "bought" the building, they have hired its services for the period they reside in it, the rent they pay is payment for those services and when paid becomes the property of the owner.

(xiii) Rate of Return - Criteria

One major effect of the well-nigh universal adoption of the depreciated original cost standard for rate base valuation since the 1940's has been to thrust all of the potential conflict over how large a return should be provided to investors onto the rate of return side of the calculation. Sufficient scope for conflict can be found in this area and the clash of interest between customer groups and regulated companies has often elevated metaphysical trivialities into major disputes.

The underlying problem (or opportunity) is provided by the fact that while the rate base (at least in its original cost incarnation) can be measured with some precision, the capital costs to which the fair rate of return concept refers cannot be measured directly at all, but must be inferred from indirect evidence.

In the following we discuss the estimation of costs of capital primarily in the context of a corporation, and usually a public corporation. An interpretation in terms of real estate investors will be provided later, in Chapter 3. For the moment, it may be sufficient to note that the purchase of shares in public companies is an option which is always available to the prospective investor in real estate. Accordingly, the yields available in that market compete with the real estate market as outlets for his funds, and determine the yields it must provide.

The basic objective of the rate base-rate of return process and of the role of the so-called fair rate of return in that process were well set forth by Mr. Justice Lamont in the Northwestern Utilities case in 1929:

> "The duty of the Board was to fix fair and reasonable rates; rates which, under the circumstances, would be fair to the consumer on one hand, and which, on the other hand, would secure to the Company a fair return for the capital invested. By a fair return is meant that the Company will be allowed as large a return on capital invested in the enterprise (which will be net to the Company) as it would receive if it were investing the same amount in other securities possessing an attractiveness, stability, and certainty equal to that of the Company's enterprise."
>
> [City of Edmonton v. Northwest Utilities Limited (1929) SCR 186 at 192]

The leading U.S. cases are in similar vein, as the following quotations will indicate:

> "A public utility is entitled to such rates as will permit it to earn a return equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties; but it has no constitutional right to profits such as are realized in highly profitable enterprises or speculative ventures.
>
> The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties."
>
> [Bluefield Waterworks v. W. Virginia Public Service Comm., 262 U.S. 679 (1923)]

> "Rates which make the company to operate successfully, to maintain its financial integrity, to attract capital, and to compensate its investors for the risks assumed....
>
> From the investor or company point of view it is important that there be enough revenue not only for operating expenses, but also for the capital costs of the business. These include service on the debt and dividends on the stock. By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital. The condition under which more or less might be allowed is not important here. Nor is it important to this case to determine the various ways in which any rate base is on which the return is computed might be arrived at. For we are of the view that the end result in this case cannot be condemned under the act as unjust and unreasonable from the investor or company point of view.
>
> [F.P.C. v. Hope Natural Gas Company, 320 U.S. 591 (1944)]

These decisions appear to contain at least three fundamental principles which are to govern the establishment of a fair rate of return for a given company with a given rate base. These include

(a) Fairness, involving the equal treatment of equals on the investor side, and possibly some more abstract notions of commutative justice as between customers and investors.

(b) Financial Integrity, involving the requirement that the allowed return be sufficient that a well-run utility be able to maintain its solvency and meet the maturing claims of its creditors.

(c) Capital Attraction, requiring that regulated companies be allowed sufficient return to enable them to raise new funds from investors.

There is a sense in which, at least in the long run, (a) and (b) can be collapsed into (c). If investors do not expect fair treatment they will simply refuse to invest and the company (project) will be unable to attract capital. When they buy securities, however, their acceptance of the terms of the contract is prima facie evidence of fairness, at least in those cases where the terms are explicit, as they are in the case of lenders. Where the terms are wholly or partly implicit as they are in the case of shareholders, there is obviously room for debate over just what was expected at the time of purchase. Consistency of treatment may be more important here than any other question of regulatory methodology, for it not only enables investors to predict how they will be treated, and reduces any risk premium they may attach in respect of "regulatory climate" but should preclude arguments about fairness arising out of possible departures from the implicit bargain.

Similarly, providing the company with a level of earnings which enables it to meet the implicit or explicit bargains it made with creditors or shareholders will ordinarily ensure not only its financial integrity and continued solvency but will enable it to attract capital in the long run.

While (a) and (b) may thus be subsumed into (c) in the long run, they provide constraints in the short run which must be met if continued ability to attract capital is to be maintained. It is, at least in theory, always possible to sell securities if they are accorded priority over existing securities (Cf. receivers' certificates) or if they are offered at a low enough price. While this short-run version of the capital attraction standard is not likely to be workable on a continuing basis, because at some point the sheep will decline to come forward to be shorn, the other two criteria can be viewed as providing assurance that the long-term version will be adhered to. Reliance for funding on new issues having priority over old, even when contractually permissible, may threaten the financial integrity of the enterprise and its continued solvency if it is undertaken when new issues of equal priority with the old are not saleable. Similarly, while sale of common stock below book value may always be theoretically possible, such sales dilute the equity of existing shareholders and, in effect, transfer that equity to the new shareholders. This treatment is clearly unequal, arguably unfair, and likely to be self-defeating in the long run.

These subsidiary criteria may also come into play in situations where there is no immediate need to attract capital, for example, in situations when the market for the regulated company's service is not

growing and where no additions to plant are necessary. In such situations advocates, and/or regulators have claimed that fairness to customers requires, and financial circumstances permit, a rate of return which might not enable the regulated company to attract new common equity. Under such conditions, earnings coverages may deteriorate and bondholders suffer a loss of market value due to deterioration in bond quality, and similar losses may be experienced by preferred shareholders. Losses may also be imposed on common shareholders even if price earnings multiples remain unchanged, which is unlikely in the circumstances. The only line of defense for a regulated company which does not have to meet the capital attraction test in the marketplace at a given point in time is that such treatment violates the principle that equals be treated equally (if common stockholders in other enterprises which differ only in respect of a need for financing receive a better rate of return) or that it threatens financial integrity (if bond ratings are likely to be reduced).

(xiv) Problems of Application

It is, of course, in the application of these relatively abstract standards that the practical problems emerge. There is a basic conceptual problem of defining what financial criterion corresponds to the long term capital attraction requirement, defined as we have noted, for a given rate base valuation methodology. Since, in general, direct measurement is impossible, there is then a practical problem of measuring, or estimating the value of the rate of return corresponding to a particular financial criterion. Finally, there are a host of practical

implementation problems relating to adjustments needed for one puprose or another.

The conceptual problem can be addressed by asking "what rate of return will an investor require to invest an additional sum in this regulated enterprise?" As this required return must come from the earnings generated by the (rate base) x (allowed rate of return) formula, knowledge of the rate base valuation treatment accorded the incremental investment will permit one to infer what rate of return provision will be necessary.

For some categories of investor, including most creditors and most investors in preference shares, the rate of return requirement will be, at least as a first approximation, invariant across all valuation methods and can be discussed without explicit consideration of valuation method. For others, including common shareholders, as well as investors in convertible or participating preferred, investors in convertible bonds, and owners of unincorporated enterprises, the required rate of return most emphatically is not invariant as between rate base valuation methodologies, and we shall have to consider the requirements of each methodology separately. Given the ascendancy of original cost valuation, we will consider investors' required rates of return under that regime first, and postpone discussion of the requirement under alternative valuation regimes until a later point. Because all of the important conceptual problems relate to the determination of the required return on common shareholders' (or unincorporated owners') equity, that problem can be viewed as fundamental and should therefore be described first. Required rates of return for other sources of capital are either self-defined

(straight debt and preferred) or in part derivative from the return required on common equity, as in the case of participating or preferred senior issues and issues with warrants attached, and can only be determined if the required rate of return on common (or owners') equity is known. This provides a further reason for examining the latter first. The focus on the investment of an additional sum is deliberate; this is after all what capital attraction is all about, and no loss of generality is implied thereby, since start-up situations involve the investment of a sum additional to these present investments of zero dollars.

The required rate of return concept is central to much of the contemporary theory of financial economics, that part of economics which is concerned with how capital markets work. In that literature, it is usually referred to as the cost of capital. The two terms will be used interchangeably here, with a prefix denoting the source of funds. The derivation is, of necessity, mathematical and has been banished to Appendix 2-3 for those readers who wish to work through it. Those who are willing to accept the correspondence between the formulas which follow and the concepts defined above should work through the derivations to be found there, others may simply proceed. The formulas are applied to a number of methods used to estimate the required costs.

While a multiplicity of methods of estimating the cost of common equity capital have emerged over the years, nearly all have proven to be variants of one of the following methods:

(a) Comparable Earnings

(b) Earnings-Price Ratios

(c) Dividend Yields

(d) Discounted Cash Flow

(e) Capital Asset Pricing Model (CAPM)

(f) Other Risk Premium Methods

(g) Use of Market-Book Ratios.

All of these work in some cases, in the sense that they correspond to the theoretical concept we have in mind, but only some of them work in all cases and even then there may be problems in their application.

(xv) Comparable Earnings

The use of comparable earnings is perhaps the oldest surviving methodology for estimating the cost of equity capital. It involves the use of rates of return (earnings) on book values of common (owners') equity for a sample of companies deemed to be comparable in risk to the regulated entity to infer what rate of return it should be allowed. Unlike the variables used in some of the other methods, those used in the comparable earnings methods are directly observable. The real problem is whether they measure the cost of capital in any meaningful sense. Where the sample is composed of other companies regulated by the same agency, the method obviously fails for reasons of circularity. While the sample consists of other companies in the same industry, regulated in other jurisdictions, this more direct form of circularity is avoided but a more subtle, indirect form of circularity may still be present if the method is widely used by regulators in a number of jurisdictions. The only samples that are safe are those drawn from unregulated industries, and there is always a question as to comparability, even if only because unregulated enterprises are free of the risks associated with regulated status.

Conceptually, comparable earnings rests on the premise that, except for risk premia, rates of return on capital will tend to equalize

across various employments and will in fact be equal in long run equilibrium. This has been a premise of classical and neo-classical economic theory since the age of Adam Smith if not before. It should be noted that this is an equilibrium condition only, and not a fact, and that even then it applies only across competitive industries. Monopolistic industries have always been regarded as an exception, and any sample may accordingly be vitiated by the inclusion of enterprises whose earnings are the result of monopoly power, either permanent or temporary, lasting during the period to which observations relate. Nor is it clear that the averaged observations across a sample provide a valid measure of what the always-sought-but-never-attained equilibrium rates of return would be. Even if they did, there is still a problem posed by the lack of correspondence between the profit concepts of accountants and economists and the related measures of capital employed. [Cf. Ayanian (1983), Grabowski and Meuller (1978)]. These measures are particularly suspect during and after periods of significant inflation, when minor differences in the acquisition dates of otherwise comparable assets (with comparable real costs) generating equivalent cash flows will nevertheless generate major differences in reported earnings rates.

One careful study has noted that even in conditions favourable to their use, i.e., an absence of inflation, steady growth, and constant true rates of return, the potential differences between accounting rates of return are such that they "can be quite large enough to account for the entire inter-firm variation in accounting rates-of-return among the largest firms in the United States" and "the belief that they are

small enough in practise to make accounting rates useful for analytic purposes rests in nothing but wishful thinking." [Fisher and McGowan (1983), see also Kolbe, Read and Hall (1984), ch. 3]. There are few situations in which a more acceptable method of estimation cannot be brought into the process, where this can be done it will ordinarily give results which are more valid than the use of the comparable earnings methods. Its use is sometimes defended, not on grounds that it generates a valid estimate of common equity costs, but on fairness grounds where it is contended that if other firms shown to be comparable to firm y are able to earn x%, equality of treatment demands that firm y be allowed to earn the same. Providing the dates at which assets were acquired are such as to render the asset bases comparable, comparable earnings may be of slightly more relevance in this context than it is in a cost-of-capital context. But the minor premise, about what fairness requires, is suspect, and the comparable earnings method is best avoided where possible.

We note that the problems of obtaining a comparable sample are present in all cases where such a sample is used in the analysis, although the circularity problems can be avoided wherever at least one of the parameters (e.g., the price) entering the cost of capital calculation is determined independently in the market place, rather than by the regulatory agency. Some methodologies, unlike comparable earnings, can be applied directly to the observations for the company itself, avoiding the sample comparability problem. But even where direct measurement is used, it will ordinarily be useful to have it corroborated by comparison with a suitable sample, because of uncertainties surrounding the estimation process.

(xvi) Earnings - Price Ratio

Oldest of the methods in which observations for the company itself is the earnings price ratio. This measure which was used for our example above, was used by the Federal Power Commission in Hope, cited above, and has at least a measure of academic credibility. Obtained by dividing accounting earnings by market prices, it is best viewed as a variant of the Discounted Cash Flow (DCF) method, valid under certain assumptions.

It is valid in the case in which all earnings are distributed and no growth in the expected income stream is anticipated. It is also, as we shall see below, valid in the particular case in which the rate of return on incremental investment is exactly equal to the cost of capital. This situation is discussed further in our discussion of the Discounted Cash Flow (DCF) method. Attempts to apply it can lead to circularity in practise.

(xvii) Dividend Yields

Dividend yields (dividends divided by market prices) in general lead to downward-biased estimates of the required rate of return. The only exception is when dividend payouts average 100% of earnings, where there are no growth prospects, and where the method becomes a variation of the earnings-price ratio method, which is a valid measure of the cost of equity capital under the same circumstances. Dividend yields figure as a component of the cost of capital in the DCF method, discounted below, and are also used as a starting point in "requirements formula" computation where a net capitalization rate base is used.

This method, in common with its predecessor and several of the methods described below, is directly applicable only to public companies because of its dependence on the market price of the shares. Application

to private companies, or to unincorporated enterprises, depends upon the fact that such enterprises compete with public companies in the capital market and provide an alternative outlet for funds. Public companies thus define the competing opportunity which defines the cost of capital for private companies and unincorporated enterprises in all lines of business, including the supply of rental housing.

The appropriateness of these opportunities as a measure of cost for the typically-smaller private company or unincorporated enterprise rests on an implicit assumption that the risk levels of small enterprises and large are comparable. Otherwise, an adjustment reflecting risk differentials needs to be made. This matter is further discussed below.

(xviii) Discounted Cash Flow Method

The most widely used cost of capital formula in current practise is probably the discounted cash-flow or so-called DCF method. This estimates the required rate of return as the sum of the dividend yield plus the rate of growth in earnings per share. In effect, this considers the two components of return an investor receives from a given investment, i.e., dividend plus capital gain.

The DCF method is based on the use of the following formula:

$$K_e = \frac{D}{P} + g$$

where K_e = the required cost
D = the current dividend
P = the current price
g = the expected growth rate

Derivation of this formula will be found in Appendix 2-3. Problems in its use stem from the fact that g, the expected growth rate, is not directly observable but must itself be estimated. Errors in estimates of g carry over and become errors in the estimate of K_e.

(xix) Capital Asset Pricing Model

An alternative which has been increasingly widely used is the so-called Capital Asset Pricing Model (CAPM), which uses characteristics of the cash-flow stream to determine a risk premium which is applied to an estimate of the risk-free interest rate to obtain a required yield. Other methods of deriving risk premia are conceptually, and presumably practically, inferior.

The use of the CAPM rests on the supposed fact that risk can be portioned into systematic and unsystematic components as a result of which income fluctuates in a way which is, respectively, correlated with changes in business conditions generally or uncorrelated with such changes. The model assumes that unsystematic risk can be virtually eliminated by appropriate portfolio diversification, so that all that needs to be compensated is the bearing of systematic risk.

This model is perhaps peculiarly inappropriate as a description of the small landlord, who owns one or two buildings and one to four rental units. His portfolio is, of necessity, distinctly undiversified, and he does not, as a consequence, avoid unsystematic risk. As a consequence his total risk is likely to be greater than that faced by a portfolio investor in public companies. This additional risk-bearing must, in the long run, be compensated if this class of investor is to continue to be attracted into the housing market.

(xx) Other Risk Premium Models

Other risk premium models used in practise have been more or less ad-hoc, and have implicitly relied on other cost-of-capital models to develop cost-of-capital estimates for allegedly comparable groups, which are then used to measure risk premia over some assumed risk free

yield. The method is useful where the basic level of yields has changed, e.g., because of inflation. This use across time periods implicitly assumes that risk premia are roughly constant through time and independent of interest rate levels. This is an assumption that may be incorrect [Gordon and Halpern (1974)].

In current practise, this method has largely been superceded by the use of the CAPM, which appears to offer an appropriate answer to the problem of risk premium determination. As noted the answer it offers is the rental property case may be quite inappropriate and further use of risk premia derived from total (not just systematic) risk may be helpful. If so, this method may be useful.

(xxi) Market-Book Ratio

It is a corollary of the DCF method that expected rates of return equal to the cost of capital generate ratios of the market value of stock to its book value which equal 1.0. [See Appendix 2-4].

A related condition links the market value of the enterprise to its replacement cost, less depreciation of its assets [Tobin and Brainard (1965) (1977)]. These conditions make it possible to use market-book (or market-replacement cost) ratios not so much as a measure of cost-of-capital, which they cannot provide, but as a check as to whether cost allowed in regulatory proceedings is perceived, by the marketplace, as adequate. This provides a most useful control on the whole system, in a situation in which market prices can be ascertained, and a number of regulatory agencies use it, not so much as a formal cost-of-capital estimation device, which it is not, but as a

means of determining whether their findings are in line with the market's requirements. Some, indeed use a target market-book ratio, usually in the 1.05 - 1.15 range, to assess whether they have correctly chosen a rate of return for the enterprise in question.

While use of the market-book ratio has, in our view, limited applicability in the context of rent review, the related market-replacement cost ratio (Tobin's q-ratio) may well be of some use in evaluating the capital-attraction properties of the system.

(xxii) Other Sources of Capital - Debt

The methods outlined above all relate to the estimation of the cost of owners or common shareholders' equity funds. While such funds constitute a necessary and basic part of the capital structure of any regulated company, most such companies utilize debt and preferred share funds, often to a preponderance over common share equity funds, and many use convertible preferreds or convertible debentures. Most small landlords use mortgages, but many corporate landlords have capital structures resembling those of other corporations. In this section we examine the determination of fair rate of return for funds raised from creditors. The basic fairness-financial integrity-capital attraction criteria apply here, as well. The difference is, that in the case of debt securities and preferreds, there is a contractual or quasi-contractual relationship between the firm issuing the securities and the buyers which effectively defines fair treatment and satisfies the other tests as well.

The relation between bondholders or mortgage-holders and issuer is a contractual one. The issuer undertakes to make certain payments

of interest and to repay principal, and may also undertake, in a trust indenture supporting the issue, to maintain certain earnings coverages, asset coverage, and/or restrictions on dividends to ensure that there is a margin of safety which will permit him to discharge his obligations.

But the contract, however, defines those obligations. If they are met, the obligation to the lender is satisfied and with it the requirement of fairness. Lenders' participation in the issuer's affairs is voluntary, and their acceptance of the terms of the contract is prima facie evidence of fairness. As long as the issuer is permitted earnings which enable its obligation to lenders to be satisfied, then, the fairness criterion is taken care of. And any system which provides a rate of return adequate to serve outstanding debt will ordinarily permit the regulated company to attract debt capital for expansion, if required, or to refund existing obligations as they fall due. Meeting the financial integrity requirement is perhaps a little more complex, as it involves considerations of balance in the capital structure. Ordinarily these are implicit in the contractual requirements imposed by lenders when the loan is made. It is reasonable to regard rates of return on debt which enable interest payments and repayment or refunding of principal and which do not force a firm into default in respect of indenture requirements as satisfying at least the minimum requirements in terms of maintaining financial integrity.

The normal regulatory practise for determining a rate of return on the debt component of its capitalization involves the use of a concept referred to as embedded cost. Embedded cost for a single issue is simply the rate of return or yield to maturity calculated using the net

proceeds received by the issuer at the time of issue, i.e., after deducting the underwriter's spread and any other flotation costs such as legal fees, appraisal fees, accounting fees, printing costs, etc. This is usually calculated using bond tables or a computer program which performs the equivalent calculation. The use of bond tables implies sinking-fund amortization of any difference between net proceeds and par value; in some cases straight line amortization formulas are used [Quirin and Wiginton (1981), p. 148] but the bond table or equivalent method is preferred.

Embedded debt cost for the enterprise is computed as a weighted average of the embedded costs of individual issues, using the amounts of the individual issues outstanding (net of redemptions for sinking fund purposes, etc.) as weights.

These are book value weights; modern financial theory suggests that for many purposes, the use of market value weights, coupled with yields to maturity computed using current market prices with an adjustment to reflect estimated issue expense, is preferable to the book value weights - lifetime yield (from issue price) combinations used for computing embedded costs. If the purpose of the calculation is to derive an estimate of the opportunity cost of funds for purposes of evaluating the worth of a proposed capital expenditure, or for certain other purposes in a forward-looking decision making context, it can be agreed that the use of current market value weights and market yields is conceptually superior.

Myers [(1972), p. 93] has criticized the use of embedded costs as "not the most logical procedure". While he favours market-value

weights and yields he does, however, claim that if market value weights are used, and interest rates rise, common shareholders may realize a windfall gain; while if interest rates fall, they may realize a windfall loss. This assertion, which is contrary to the rational expectations theory of valuation, does not appear to be correct, since the equity cost can be expected to adjust downward if there is a prospective gain, upward if there is a loss. As the computation of the required adjustment is complex, it is quite possible that the result he suggests could result as the consequence of regulatory error. While there is no reason for it to do so, the use of embedded costs and book value weights is operationally simpler and less likely to result in error. That alone is reason enough to adopt it.

(xxiii) Preferred Shares

Preferred shares, from a financial point of view and ignoring the prior claims of debt, involve an undertaking, though not contractual, to pay a fixed dividend on a regular basis. Some issues require, in addition, that the issue be retired via a sinking fund. Alternatively, they may be retractable, that is to say redeemable at a specified price on or after a certain date at the option of the holder. These involve obligations which are, if kept, the equivalent of the obligation undertaken when debt is issued. Apart from the difference in tax treatment, in which interest paid is deductible by the borrower (with some exceptions, notably in the real estate field[1]) and taxable in the hands of the recipient, while preferred dividends are non-deductible by the

[1]Interest on funds used to acquire land held for development is not deductible [Income Tax Act, S. 18(3)] and interest on properties which are not MURB's is deductible against other income up to certain limits [20(1)].

issuer and not taxable in the hands of a corporate holder, preferred share capital is much the same as debt.

For regulatory purposes, in computing the required rate of return, preferred shares are treated like debt, and enter the overall rate of return calculation on an embedded cost basis.

(xxiv) Convertible Issues

Convertible bonds or preferreds may be, under certain conditions, converted into common share equity at a specified ratio of exchange. Such issues are usually given an embedded cost treatment, using book value weights. There are, in financial texts, formulas for the computation of costs for such issues which compute lifetime cost as a weighted average of the initial cost, to estimated conversion date, and the common equity cost, applicable after that date. [Weston and Brigham (1978), p. 697, note 6; Quirin and Wiginton (1981), pp. 169-171].

In regulatory practise, if costs computed using this formula are used, the company will earn an amount determined by the formula while the issue is outstanding, and an amount equal to the common equity cost after conversion takes place. All that is necessary to compensate the investor is the contractual yield on the issue as debt or preferred while it is outstanding in this form; it will earn the allowed common equity rate after conversion in any event. As a consequence the Weston/Brigham/Quirin/Wiginton treatment of convertibles preferred shareholders is unduly generous; the benefits accrue not to the perferred shareholders but to the common shareholders.

(xxv) Capital Structure and Weighting

As noted above, the usual practise is to convert the specific costs for different kinds of capital used by the regulated company in a rate of return to be applied to the rate base by using book value weights, although it is possible to develop a conceptually correct rate of return using market value weights. The latter will yield the same revenue requirements as the former.

What must be emphasized is that both debt costs and equity costs are functions of the capital structure and that neither can be expected to remain invariant if capital structure is altered.

There are models which purport to explain the functional relationship and the manner in which costs of each respond to differences in capital structure. [Modigliani and Miller (1958),(1961)]; these need not concern us at this point however.

The major implication of the model is that where possible, actual weights should be used. This is not always possible. To an increasing extent, regulated businesses in Canada (and in the U.S.) have come under the control of unregulated enterprises, or other regulated enterprises, or have themselves invested significantly in unregulated lines of business. These conjoined lines may differ appreciably in risk from those of the utility operation, and it is necessary for the regulators to unscramble the resulting omelet, in some way or another. The usual basis on which this is done is to estimate what capital structure the regulated operations would have on a "stand-alone" basis. This usually

involves assigning a pro-forma capital structure to the regulated business and allowing it a return on equity derived from a sample of "comparables".

It will sometimes be desirable to approach the problem of setting a pro-forma capital structure by allocating the existing capital structure to the individual business units on a fully-reconciled basis. One basis for doing so uses the CAPM on the premise that each unit is assigned enough equity so that its estimated β_i is the same as that of the firm. This enables the observed equity cost of the firm to be applied to the common share equity costs of each of the component units, including, of course, the regulated unit. This approach anchors the resulting estimates to the realities of the firm itself, rather than invoking the sometimes arbitrary choice of comparables. For more on the estimation of costs of capital for sub-units of a firm see Gordon and Halpern (1974), Bower and Jinks (1975), Fuller and Kerr (1981), Conine and Tamarkin, (1985) and Quirin and Wiginton [(1981), pp. 358-64].

The existence of mixed enterprises in the rental housing market is believed by many to be a relatively limited phenomenon at the present time. [But Cf. Olympia and York]. To a considerable extent, at the unincorporated level, ownership of rental housing is combined with ownership in other businesses, also unincorporated, e.g., as a retailer or a contractor. As a consequence, the problem of determining costs of capital for components of a mixed enterprise is a significant one for any prospective regulatory system.

(xxvi) Treatment of Income Taxes

Interest payments are deductible from income (in most cases, see p. 112 above) for the purpose of determining income tax liability. Consequently, the portions of fair return corresponding tax liability. Consequently, the portions of fair return corresponding to interest on debt do not, generally, attract taxation and no provision needs to be made for the tax liability thereon. Return on preferred shares, and on common, however, qualifies as taxable income and it is accordingly necessary to "gross-up" these components of return, which have been computed on a net-of-tax basis, in order to meet tax liabilities and at the same time provide the income required by investors in preferred and common shares.

While this step is conceptually easy it is complicated by the fact that most regulatory systems require that depreciation on rate base assets be computed on a straight line basis, while the Income Tax Act permits the corresponding deduction of Capital Cost Allowance on a declining-balance basis, using a somewhat higher initial rate. The resulting timing differences in the recognition of this item of expense for regulatory and financial reporting purposes, on the one hand, and for tax purposes on the other, create complications and provide two alternative methods for the grossing-up of earnings and therefore for the computation of revenue requirements.

The first method is referred to as the "tax allocation method". In it, the allowed earnings as computed for regulatory purposes are grossed up by a factor $1/(1-T)$ (where T is the applicable marginal tax rate) to determine allowed earnings. As earnings are realized, the corresponding amount is charged to income tax expense for regulatory and income statement purposes. Any excess (deficiency) of the amount

so charged over the actual tax paid is credited (charged) to an account called "Deferred Income Taxes" which is located on the balance sheet between liabilities and the capital account. Where they exist, deferred taxes are a component of the capital structure used to finance the acquisition of the assets which are in the rate base. These are a significant factor in the rental housing industry. They may or may not be allowed a return, under circumstances to be described below.

In the alternative treatment, the gross-up is adjusted so that it will equal only the taxes which have to be paid. This approach is known alternatively as the "taxes-paid" method or as the "flow-through" method, so-called because the tax effects resulting from the discrepancy between regulatory and tax depreciation are, in effect "flowed through" to customers.

The accounting treatment of taxes, particularly in a regulatory context, has created major controversy for the past 20 years or more. Both the Canadian Institute of Chartered Accountants (in Canada) and the Financial Accounting Standards Board (in the U.S.) require firms to report on a tax-allocation basis, and most regulatory jurisdictions in the U.S. have conformed their practise to this requirement, encouraged in some cases by legislation that denies accelerated write-offs to regulated firms that pass them along to customers. The legislation is based on the premise that the purpose of providing accelerated write-offs is to provide an incentive to invest in plant and that that purpose is frustrated by regulation on a flow-through basis.

In Canada, the CICA has provided an exception to the general rule for regulated companies only, where a different rule is applied by the regulatory body and where

> "...there is reasonable expectation that all taxes payable in future years will be:
>
> (a) included in the approved rate or formula for reimbursement and
>
> (b) recoverable from the customers at that time..."
>
> [CICA Handbook ss 3470.58]

Where these conditions are met, use of the taxes paid method for financial reporting purposes, is permitted providing the appropriate disclosure is made. It is by no means clear that the exception would apply to a landlord.

Many regulatory jurisdictions in Canada have either adhered to the "flow-through" method consistently since the introduction of the present Capital Cost Allowance system in 1949, or have switched to it in order to mitigate the effects of inflation on rates otherwise payable in the past decade or so. Our review of U.S. experience indicates the opposite shift, i.e., a shift towards tax allocation, often under legislative duress.

Much of the case for flow-through rests on the claim that, in a utility with a pool of assets which continues to grow at a sufficient rate, none of the "taxes" credited to the deferred tax account will ever have to be paid. Critics of "flow-through" claim that this is irrelevant, as well as untrue, that deferred taxes on an individual asset will become payable in the normal course of business, and that provision should be made for tax repayment. The only reason, they suggest, why no net repayment may be necessary, is that if more taxes are deferred on new investment than become payable on older assets, it is only the net difference which is charged to deferred taxes in any one year.

To see why this is so, consider first a single asset, e.g., a vehicle, which has a cost of $10,000, salvage value of $1,000, and a life of 6 years. The annual charges to depreciation, for regulatory and reporting purposes are shown in column A of Table 2-2 assuming purchase on January 1 of Year 1. Assuming a Capital Cost allowance rate of 30% for this vehicle class, the tax deductions for capital cost allowance are those shown in Column B of Table 2-2. The difference between the two, reported in Column C, is the resulting timing difference in the recognition of income. Column D shows the credit (debit) to deferred taxes for each year the vehicle remains in operation, at an assumed tax rate of 50%. Finally, Column E shows the balance in the deferred tax account which results from the use of this asset.

Table 2-2, while it presents numbers relevant only for a single class of asset, brings out several features of the Canadian Capital Cost Allowance (CCA) system which are relevant at least in the single asset context that represents many of the units in the rental housing stock. These are as follows:

(1) The excess of CCA over depreciation and the resultant credits to deferred taxes, last only a fraction of the life of the asset (to the end of year 3 in the example).

(2) This stage is followed by a period in which depreciation is in excess of CCA, and in which taxes payable exceed taxes booked, and the former credits to deferred taxes become debits (years 4-6).

(3) At some stage in this period, (after year 5) the deferred tax balance becomes negative, and is actually an accelerated

tax balance. This is a feature unique to the Canadian system and is not found in the comparable situation in the U.S. where it is possible to switch back to straight line depreciation at the taxpayer's option. It occurs in most cases at the end of the asset's useful life in those cases in which salvage value of the assets is not large in comparison with initial costs.

(4) Over the life of the asset, the CCA system recovers only part of the asset's cost; the balance is in most cases recovered after the life of the asset has expired due to continued charges against pooled assets in the appropriate CCA class. It is then, when viewed from the asset-life perspective, a deferred-depreciation system, rather than an accelerated depreciation system.

Table 2-2 of course, shows what happens to a single asset (although the charges in years 7, 8, etc., reflect an assumption of pooling) or the equivalent, a number of like assets acquired at the same time. It can be shown, however, that if investment is continued and the amount invested annually increases at a sufficient rate, the combined balance of the deferred tax accounts for like individual assets increase continuously and without limit. This is what leads to the "indefinite deferral" argument of "flow-through" advocates. It is not pursued here because it is quite inconsistent with the facts of the typical rental property situation, in which an asset (a building) is acquired and operated on a standalone basis by the owner. Some major developers have, indeed, managed to grow deferred taxes on large and growing numbers of units and to avoid tax payments. These are the exception rather than the rule,

TABLE 2-2

Timing Differences and Tax Deferral Under the Canadian Capital Cost Allowance System

Year	A Book Depreciation	B Capital Cost Allowance	C Difference (B-A)	D Tax Deferred (year)	E Tax Deferred (Balance)
1	1,500.00	1,500.00	--	--	--
2	1,500.00	2,550.00	1,050.00	525.00	525.00
3	1,500.00	1,785.00	285.00	142.50	667.50
4	1,500.00	1,249,50	(250.50)	(125.25)	542.25
5	1,500.00	874.65	(625.35)	(312.68)	229.57
6	1,500.00	612.26	(887.74)	(443.87)	(214.30)
7	0	428.88	428.58	214.29	(.01)
8	0	300.00	300.00	150.00	149.99
9	0	210.00	210.00	105.00	254.99
10	0	147.01	147.01	73.51	328.50
11	0	102.90	102.90	51.45	379.95
12	0	72.03	72.03	36.02	415.97
13	0	50.42	50.42	25.21	441.18
14	0	35.30	35.30	17.65	458.93
15	0	24.71	24.71	12.36	472.29
		etc.	etc.	etc.	etc.

and the facts of the usual case suggest that use of the "tax allocation" method would be preferable in any cost-of-service regulatory scheme constructed for rental housing. This is because the annual tax burden incorporated in the revenue requirement is more stable than that generated by a "flow-through" charge, and that it allocates tax liability over the life of the asset to early tenants and later tenants in an equitable manner, preserving "intergenerational" equity between different classes of tenants.

(xxvii) Experience Under Inflation

As noted earlier, cost of service regulation has been in operation, in some industries, for over 100 years in the U.S. Canadian experience is almost as long. During that time, the regulated industries have, in general, been able to attract capital and grow. For the last 40 years, the experience has been confined almost totally to systems based on original cost rate bases. Such systems have been severely tested in the last decade and a half, as inflation rates have accelerated to a degree previously unimaginable and, finally decelerated to a rate that is nevertheless high by historical standards.

Our discussion above suggested that original-cost-based systems were incapable of responding to unanticipated inflation; they throw the risk of unanticipated inflation into the backs of investors. To the extent that inflation is anticipated, inflationary anticipations will become embodied in required yields and, if the latter are appropriately reflected in allowed rates of return, regulated companies should have no difficulty in attracting capital, and market-book ratios will be maintained at values of 1.0 or above.

In general, the experience of regulated companies in Canada during the 1970's and 1980's has been, judged by the above criterion, satisfactory at most times. During the 1981-1982 interest rate crunch, regulated companies may have encountered some financing problems but these were no more pronounced than those experienced by unregulated industrials. Companies' experiences varied, depending essentially on the degree to which regulators adopted policies appropriate in the inflationary context of the times.

One device of some importance in this context is the choice of a test year. Application of the cost-of-service model requires the determination of revenue requirements, comprising the sum of allowable expenses plus allowed return for a test year. This has usually been the most recent year for which audited financial statements are available. When such a test year is used, and allowed revenues determined a year or more after the test year has concluded, it is reasonable to expect inadequate earnings to result in an inflationary period if only because expenses have escalated. Most of the Canadian jurisdictions adopted, in the early 1970's, forecast test years in which projected rate bases and projected expenses were incorporated into the determination of allowable earnings. To a degree, use of a forecast test year is implicit in Ontario rent review procedures.

Because of this device, and because of a realistic recognition of capital market required yields, most of the regulated companies in Canada came through the inflationary period with market-book ratios consistently above 1.0, (in some cases excessively so), and were able to finance their

investment requirements with comparatively little difficulty. The only exceptions were the railways, which suffer from an inability to earn allowed returns, and the telecommunications enterprises regulated by the CTC and later by the CRTC. The railways' problem transcends regulation and will not be discussed here. The telecommunication enterprises, which do not suffer from the same problem as the railways, nevertheless experienced a period of several years in which market-book ratios were distinctly below 1.0, in the .85-.9 range, in which continued investment was possibly only at the expense of diluting the equity existing shareholders.

The experience of regulated utilities in the U.S. was distinctly more unfavourable. [Brimmer (1974)]. Following Consolidated Edison's dividend cut in 1974, the bulk of the regulated electric and gas utilities shares fell below book value and stayed there for most of the next decade. Telecommunications utilities had a somewhat better experience. We have reviewed this experience in a number of situations; the problem was caused in nearly all cases by insistence on retrospective test years and by holding allowed rates of return on common equity at levels well below those indicated by market criteria. The differential experience as between Canada and the U.S. appears to relate to the degree of politicization of the regulatory process. In many U.S. jurisdictions, utility commissioners are elected. In others, they are politically appointed. In all, they appear to see their role as holding down rates by any device available. It is this devotion to the short-term consumer interest which is responsible for the inability of many utilities to obtain financing on reasonable terms. The experience of U.S. utilities in the 1970's, in our view, totally contradicts the

"regulatory capture" theories of Stigler (1975) and his disciples, it also serves to show that no system can be any better than its of return to utility stockholders will indeed hold rates down, but only at the expense of the ability to attract capital and maintain adequate supplies of the regulated commodity in the long run.

Politicization is in some measure, the inverse of the degree of stability in rate making procedures. When the latter are routinized, or bureaucratized if you will, the process is well understood by all parties and leads to a relatively predictable conclusion. Politicization is apt to be important where significant parts of the process have not been routinized, and tied to market indicators, or where the routine is for reasons not fully anticipated in its design (e.g., inflation) not capable of producing a predictable answer. These considerations suggest that any rent control system is likely, if only because of its novelty in comparison with other regulated industries, to be more subject to politicization than not. This does not bode well for the success of a new rent control venture in a market in which there is a need to attract new capital into the market on a continuing basis. The existing system in Quebec, which may at first glance be successful and effective, operates in a demographic context in which markets are easily cleared; to be blunt about it, other decisions of the Quebec government (e.g., Bill 101) have relieved pressure on the housing market to a degree which it may not be desirable to replicate in other provinces.

(xxviii) Depreciation

(a) Relevance of Depreciation in a Regulatory Context

In an ordinary business enterprise, depreciation is nothing more than an accounting charge levied against operating income so as to allocate the cost of a depreciable asset, less any allowance for salvage value, over its life in some acceptable manner. In an enterprise regulated on a cost-of-service basis, it plays a much more important role, in two ways. If anything, as we note, it is likely to be more important in a regulated real estate venture.

Firstly, since cost-of-service is computed on a bottom-line upward basis, by a succession of additions to desired net income, depreciation expense is usually an important component of cost-of-service and thus of (target) revenues. This relationship between revenues and net profit in a regulated company is just the reverse of that in an unregulated company where net income is determined by a series of deductions from revenues.

Secondly, in the cost-of-service model, the net revenue requirements include a return on rate base component, which is the product of an allowed rate of return times a rate base, which is usually measured on a net-asset basis, after deducting accumulated depreciation. The depreciation process thus influences a second component of the cost of service. As this is the component which ultimately determines the earnings which will accrue to bondholders and equity owners, it thus ultimately helps to determine the economic values of the enterprise; its role in the determination of the book, or accounting, value of the assets is quite direct and obvious.

Most regulated enterprises employ debt financing as well as an equity component. The riskiness of the debt financing, and ultimately the financial integrity of the enterprise and its ability to attract capital is dependent on there being margins of safety, in terms of asset coverage in excess of the indebtedness and in terms of the annual cash flows being in excess of the annual costs of servicing the debt.

The annual safety margin may be expressed in terms of an excess of total return over interest charges, or in terms of cash flow in excess of the payments required to amortize the debt. Both concepts are relevant to lenders. In general, expected annual safety margins should grow, if possible, reflecting the greater uncertainties associated with receipts which are expected farther into the future. Most lenders apply, in their decisions to grant or deny credit, minimum coverages which vary from lender to lender, but which any regulation scheme must take into account. As part of the required safety margin is provided by depreciation accruals, depreciation allowed is a major factor in determining the credit-worthiness, and hence the capital-attraction potential, of a project.

Asset coverage ratios, discussed below, are also important in some contexts.

Depreciation remains a relatively contentious issue in the rent regulation context, for the reasons outlined above.

(b) Depreciation Methods

Three classes of depreciation methods are worthy of consideration in a regulatory context. These are

(i) Straight Line

(ii) Sinking Fund

(iii) Accelerated Methods

A brief description of each follows.

(i) Straight Line

Straight line depreciation charges to depreciation expense each year an amount equal to the original cost of the depreciable asset, minus net salvage value, divided by the estimated life of the asset. It takes its name from the fact that net book values (cost less accumulated depreciation) at the end of each period fall along a straight line connecting original cost and salvage values, as shown in Figure 3.2.

Straight line depreciation has the estimable advantage of being easy to explain and to understand, and the no-longer-seriously-relevant advantage of being easy to compute manually. It also lends itself to group methods of depreciation which are applicable in cases where there are a large number of basically similar assets, differing perhaps in "vintage" or date of acquisition. Perhaps because of this, it has become quite widely used in regulatory practise, particularly for assets like rails, joints of pipe, telephone or power poles, or switches which certain types of regulated company employ in large numbers. Where single assets are very large, relative to the size of the enterprise, distinctly different from others in the same general category, or otherwise unique, and where one or a small number of units is all there are (as in the case

of rental housing), group methods of depreciation are of dubious applicability, though sometimes proposed, and the advantages of the straight line method itself diminish. It is, however, still frequently used for such assets because of the advantages cited earlier.

(ii) Sinking Fund

Less commonly used than formerly, the sinking fund method computes an annual charge which , if set aside in a sinking fund and invested at a predetermined rate of compound interest, would accumulate to a sum equal to the difference between original cost and net salvage value by the asset's projected date of retirement. Sinking funds in this form are seldom used any longer, but depreciation accruals may, in practise, be invested in other rate base assets on which a rate of return is earned; in this context the facts of the use to which depreciation is put correspond to the assumptions of the method. Alternatively, sinking fund accruals may be used to retire debt, which has the equivalent effect.

Under the sinking fund method, recorded net asset values do not decline in a straight line but decline slowly at first, more rapidly in later years, depending on the interest rate assumed. One such profile appears in Figure 2.2, for rates of 12% and an assumed life of 40 years.

The sinking fund method applied in a regulatory context, with an assumed interest rate equal to the allowed rate of return, has the property that the sum of the annual depreciation charge plus the return allowed on the undepreciated balance of the rate base is a constant. This constant is sometimes referred to in the engineering economy literature as the "capital recovery factor" [Grant, Ireson, and Leavenworth (1982), pp. 36-37]. In comparison, the sum of the allowed return plus

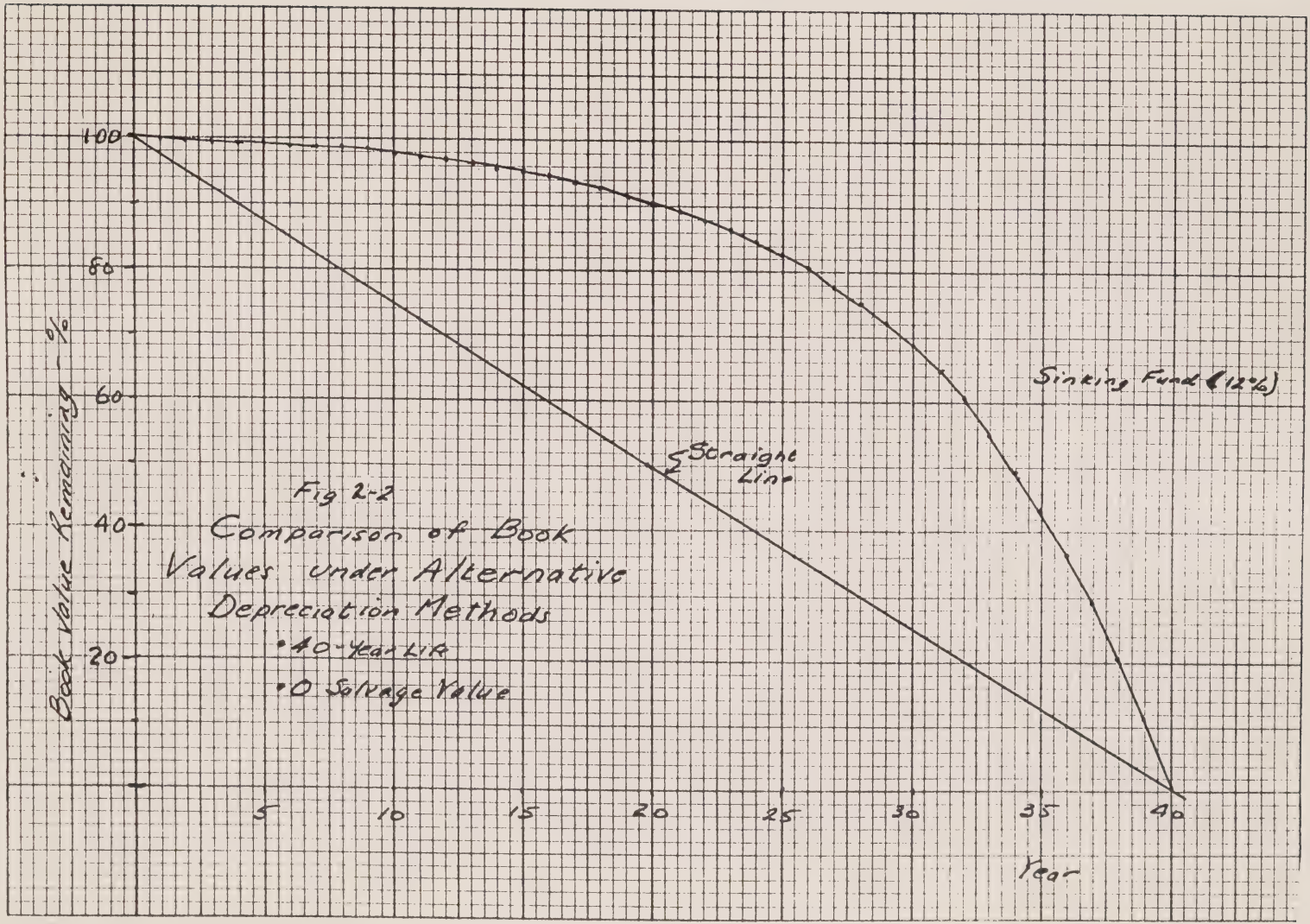

Fig 2-2
Comparison of Book Values under Alternative Depreciation Methods
• 40-Year Life
• 0 Salvage Value

the depreciation charge decline when straight line depreciation is used, and declines even faster when accelerated methods are used. Accelerated declines may be appropriate when the investment is in a capital good in a relatively new technology, where productivity improvements on new assets make them less costly on a unit-output basis than their predecessors. In such cases, a larger annual charge will often be necessary to permit an older asset to compete, on an annual cost basis, with new assets employing superior technology.

In the case of housing, these considerations are largely absent, and a well-maintained continuously renovated older property should have little difficulty competing with new properties on an even-cost basis. Consequently there is no compelling need to use straight line or accelerated methods to avoid understating the decline in value of the property. Under these conditions, the choice is one of regulatory expedience, tempered perhaps by considerations of effects on financial safety margins.

(iii) Accelerated Methods

Accelerated methods include the declining balance method, one version of which is familiar as the Capital Cost Allowance provisions of the Income Tax Act. Another widely discussed in U.S. accounting texts, the sum-of-the-years' digits method, similarly owes its familiarity to its being an allowable method under the U.S. Internal Revenue Code. As it is not allowable for tax purposes in Canada, and has little else to commend it in a regulatory context it will not be discussed here.

The declining balance method is allowed for tax purposes; some implications of its use are discussed supra under the heading "Income Tax Expense." It is frequently stated that the use of C.C.A. depreciation, at initial rates higher than the relevant straight-line or sinking-

fund rate, is, and was intended as, a tax incentive. This is, to some degree, misleading. Investment decisions are, typically, made on the basis of expected after tax cash flows and their present values. If an equal annual payment is expected the annual requirement is equal to the sum of the required rate of return plus the sinking fund depreciation charges. The imposition of any tax on income increases the magnitudes of the (before tax) annual income stream needed to produce the required after-tax stream. Hence there is a disincentive to investment. The gross up for tax at the rate T is simply the factor 1/(1-T), less an allowance for the present value of depreciation claimable for tax purposes. If capital expenditures are allowed to be written off at 100% in the year in which they are made (treatment reserved in Canada for "tax shelters" such as movies and intangible drilling costs of oil wells) and if there is an ability to recover the resultant tax credit from other income sources, it can be shown that there is no increase in the required income stream needed to compensate for the tax, nor in its present value. [Kay and King (1978)] In all other instances, some increase in the income stream is needed to compensate for the tax. About all that can be said for the declining balance C.C.A. system is that it creates less of a disincentive than other conceivable tax systems which limit the deductibility of depreciation for tax purposes to the amount computed under the straight line or sinking-fund methods.

(c) Effects of Alternatives

The effects of alternative methods of depreciation rate base on valuation, and on income streams and cash flows associated therewith, has already been noted in general terms. In this section we compare the safety margin impacts, on income, cash flow, book values and present values under an assumption that a unit property costing $40,000 (land $5,000, buildings $35,000) is depreciated over a forty year life, but is financed with a mortgage loan of 85% of the purchase price, at an annual rate of 12.5%, amortized over 25 years. The allowed rate of return, and the assumed rate for sinking fund purposes, is also assumed, in this example, to be 12.5%.

Table 2-3 shows the computed allowed returns in the straight-line depreciation case, and in the sinking fund case. The ratio of allowed return to annual interest cost, in the straight line case, allows an initial earnings coverage ratio of 1.16, which declines for the first 12 years after the investment is made, dropping as low as 1.03. In the sinking fund depreciation case, the initial coverage ratio is 1.18. The more important thing is that the rate rises continuously from the first year.

Table 2-4 compares annual cash flow received with annual debt service charges. Initial cash flow in the straight line case is larger, producing a coverage ratio of 1.30 times debt service costs vs only 1.12 provided in the sinking fund case. The difference, however, is that the sinking fund case coverage ratios remain unchanged, whereas the straight line coverage ratio drops below 1.0, implying that current cash flow is no longer adequate to meet debt servicing costs, after the 13th year.

TABLE 2-3

INTEREST COVERAGE RATIOS, STRAIGHT LINE VS SINKING FUND DEPRECIATION

	Straight Line			Sinking Fund	
	(1)	(2)	(3)	(4)	(5)
Year	Allowed Annual Return	Annual Interest Cost	Ratio (1) ÷ (2)	Allowed Annual Return	Ratio (4) ÷ (2)
1	4,945.31	4,250.00	1.16	5,000.00	1.18
2	4,835.94	4,220.49	1.15	4,995.04	1.18
3	4,726.56	4,187.29	1.13	4,989.45	1.19
4	4,617.19	4,149.94	1.11	4,983.17	1.20
5	4,507.81	4,107.92	1.10	4,976.11	1.21
6	4,398.44	4,060.66	1.08	4,959.22	1.22
7	4,289.06	4.007.48	1.07	4,949.16	1.23
8	4,179.69	3,947.66	1.06	4,937.84	1.25
9	4,070.31	3,880.34	1.05	4,925.10	1.27
10	3,960.94	3.804.64	1.04	4,910.78	1.29
11	3,851.56	3,719.45	1.04	4,894.66	1.32
12	3,742.19	3,623.63	1.03	3.876.53	1.35
13	3,632.81	3,515.83	1.03	4,856.14	1.38
14	3,523.44	3,394.54	1.04	4,833.19	1.42
15	3,414.06	3,258.10	1.05	4,907.38	1.48
16	3,304.19	3,104.61	1.06	4,778.34	1.54
17	3,195.31	2,931.92	1.09	4,745.67	1.62
18	3,085.94	2,732.63	1.13	4,708.92	1.72
19	2,976.56	2,519.10	1.18	4,667.57	1.85
20	2,867.19	2,273.23	1.26	4,621.05	2.03
21	2,757.81	1,996.62	1.38	4,568.72	2.28
22	2,648.44	1,685.44	1.57	4,509.85	2.67
23	2,539.06	1.335.36	1.90	4,443.62	3.32
24	2,429.69	941.52	2.58	4,359.10	4.63
25	2,320.31	498.45	4.66	4,285.28	8.60

═══ denotes minimum coverage

TABLE 2-4

ANNUAL CASH FLOW COVERAGE RATIOS - STRAIGHT LINE VS SINKING FUND DEPRECIATION

	Straight Line			Sinking Fund	
	(1)	(2)	(3)	(4)	(5)
Year	Annual Cash Flow	Loan Amortization	Ratio (1) ÷ (2)	Annual Cash Flow	Ratio (4) ÷ (2)
1	5,820.31	4,486.08	1.30	5,039.70	1.12
2	5,710.94	4,486.08	1.27	5,039.70	1.12
3	5,601.86	4,486.08	1.25	5,039.70	1.12
4	5,492.19	4,486.08	1.22	5,039.70	1.12
5	5,382.81	4,486.08	1.20	5,039.70	1.12
6	5,273.44	4,486.08	1.18	5,039.70	1.12
7	5,164.06	4,486.08	1.15	5,039.70	1.12
8	5,045.69	4,486.08	1.12	5,039.70	1.12
9	4,945.31	4,486.08	1.10	5,039.70	1.12
10	4,835.94	4,486.08	1.08	5,039.70	1.12
11	4,726.56	4,486.08	1.05	5,039.70	1.12
12	4,617.18	4,486.08	1.03	5,039.70	1.12
13	4,507.81	4,486.08	1.00	5,039.70	1.12
14	4,398.44	4,486.08	.98	5,039.70	1.12
15	4,289.06	4,486.08	.96	5,039.70	1.12
16	4,179.69	4,486.08	.93	5,039.70	1.12
17	4,070.31	4,486.08	.91	5,039.70	1.12
18	3,960.94	4,486.08	.88	5,039.70	1.12
19	3,851.56	4,486.08	.85	5,039.70	1.12
20	3,742.19	4,486.08	.83	5,039.70	1.12
21	3,632.81	4,486.08	.81	5,039.70	1.12
22	3,523.44	3,386.08	.79	5,039.70	1.12
23	3,414.06	4,486.08	.76	5,039.70	1.12
24	3,304.69	4,486.08	.74	5,039.70	1.12
25	3,195.32	4,486.08	.71	5,039.70	1.12

In addition to earnings coverage, an income-related concept, it is also necessary to consider asset coverage, a liquidation-related concept. Here again, there are two values. One compares the ratio of book values of assets to the book values of debt. This version, because it can readily be measured from financial statements, is the more frequently used. More meaningful, perhaps, in an economic context, is the ratio of the present value of expected cash flows with the present value of the payments required to amortize the debt.

Table 2-5 shows computed assets coverage ratios, at book value, for the two alternative methods of depreciation. Here we note that the initial asset coverage ratio, lower in the straight-line case than in the sinking fund case, drops initially, reaching a minimum of about 1.05 at the end of year 12, before rising. The sinking fund model starts with a higher coverage ratio and climbs from the beginning. This, of course, reflects an assumed asset life in excess of the amortization period of the debt, but the same life is assumed in the straight line case, and the problem of shrinking coverage ratios would be even more acute if a shorter life were assumed for the building.

Finally, Table 2-6 compares present values of the remaining cash flow stream with the present value of debt service obligations for the two cases. The story is basically the same as that revealed by the analysis of book values: coverage on the straight-line case drops for the first dozen or so years, then rises, while coverage in the sinking-fund case climbs, in this case from a higher initial value.

TABLE 2-5

ASSET COVERAGE AT BOOK VALUE
STRAIGHT LINE VS SINKING FUND DEPRECIATION

	Straight Line			Sinking Fund	
	(1)	(2)	(3)	(4)	
At End of Year	Net Assets	Net Debt	Ratio (1) (2)	Net Assets	Ratio (4) (2)
1	39,125	33,764	1.16	39,960	1.18*
2	38,250	33,498	1.14	39,915	1.19
3	37,375	33,200	1.13	39,865	1.20
4	36,500	32,863	1.11	39,808	1.21
5	35,625	32,485	1.10	39,734	1.22
6	34,750	32,060	1.08	39,673	1.24
7	33,875	31,581	1.07	39,593	1.25
8	33,000	31,093	1.06	39,502	1.27
9	32,125	30,437	1.06	39,401	1.29
10	31,250	29,756	1.05	39,286	1.32
11	30,375	28,989	1.05	39,157	1.35
12	29,500	28,127	1.05	39,012	1.39
13	28,625	27,156	1.05	38,849	1.43
14	27,750	26,065	1.06	38,665	1.49
15	26,895	24,837	1.08	38,459	1.55
16	26,000	23,455	1.11	38,226	1.63
17	25,125	21.901	1.15	37,965	1.73
18	24,250	20,153	1.20	37,671	1.87
19	23,375	18,186	1.29	37,340	2.05
20	22,500	15,973	1.41	36,968	2.31
21	21,625	13,484	1.60	36,550	2.71
22	20,750	10,683	1.94	35,549	3.33
23	19,875	7,532	2.63	34,282	8.60
25	18,125	0	N.A.	33,528	N.A.

* = minimum

TABLE 2-6

ASSET COVERAGE - P.V. OF CASH FLOWS
STRAIGHT LINE VS SINKING FUND DEPRECIATION

	Straight Line			Sinking Fund	
	(1)	(2)	(3)	(4)	(5)
Year	Cash Flow PV.	Loan PV.	Ratio (1) ÷ (2)	Cash Flow PV.	Ratio (4) ÷ (2)
0	39,521	34,000	1.16	40,000	1.18
1	38,641	33,764	1.14	39.960	1.18
2	37,761	33,498	1.13	39,916	1.19
3	36,880	33,200	1.11	39,865	1.20
4	35,998	32,863	1.10	39,808	1.21
5	35,116	32,485	1.08	39,745	1.22
6	34,232	32,060	1.07	39,674	1.24
7	33,347	31,581	1.06	39,593	1.25
8	32,461	31,042	1.05	39,502	1.27
9	31,573	30,437	1.04	39,401	1.29
10	30,684	29,755	1.03	39,286	1.32
11	29,793	28,989	1.03	39,157	1.35
12	28,900	28,127	1.03	39,012	1.39
13	28,006	27,156	1.03	38,849	1.43
14	27,139	26,065	1.04	38,666	1.48
15	26,133	24,837	1.05	38,459	1.55
16	25,111	23,455	1.07	38,227	1.83
17	24,070	21,901	1.10	37,965	1.73
18	23,009	20,153	1.14	37,671	1.87
19	21,925	18,186	1.21	37,340	2.05
20	20,813	15,973	1.30	36,968	2.31
21	19,672	13,484	1.46	36,549	2.71
22	18,498	10,683	1.73	36,079	3.37
23	17,288	7,532	2.30	35,548	4.71
24	16,035	3,987	4.07	34,953	8.77
25	14,734	0	∞	34,282	∞

(d) Handling Depreciation in Current Dollar or Replacement Cost Valuation System

Our discussion of depreciation to this point has been in the context of an original-cost-based regulatory scheme. Where the rate base is valued in current dollars, with a purchasing power adjustment, or in replacement cost terms, the original cost records continue to provide the base. It will be necessary to keep asset accounts at original cost, and the related accumulated depreciation account stated in original cost terms, reflecting whatever depreciation convention has been adopted. This will ideally be kept on an asset-by-asset basis or, at the very least, by vintage groups for each asset class, i.e., including all the assets in the class acquired in a given year. These are then adjusted using appropriate index numbers to the desired valuation base. Annual depreciation expense charges are similarly calculated on an original cost basis and adjusted.

The index numbers used should reflect price level changes or replacement cost changes since the date of acquisition. Where split-inventory methods are used, some fraction of the original cost value is left unadjusted or a suitable adjustment to the index numbers is made.

(e) Conclusions

While straight line depreciation may provide a practical and satisfactory solution to the problem of computing depreciation accruals and accumulated depreciation in a situation where the regulated company is continuously acquiring assets in significant quantities, its use in a single asset situation, such as a rental building, poses real problems in terms of maintaining adequate coverages of liabilities and/or debt

amortization charges. These problems are resolved more satisfactorily when depreciation, for regulatory purposes, is computed on a sinking fund basis with an assumed interest rate comparable to the interest rate on the company's debt.

3. Conclusions

The length of our review of the rate-base-rate of return method of regulation gives some idea of its complexity. It is this very complexity that gives this method of regulation, more than any other, the flexibility to operate in a diversity of industries not only in companies conforming to the norm of their industries but in companies deviating from that norm, and to do so successfully, if success is defined as operating at prices which are the lowest consistent with the need to attract capital. While other regulatory models are simpler, the simplicity is usually gained at the cost of one or another party to the regulatory process.

The complexity of the rate-base-rate of return model also makes it an extremely expensive form of regulation. A contested rate case involving a company regulated under this model may absorb anywhere from 2 to 100 hearing days, perhaps in the order of four or five man-years of effort involved in preparing the case, hearing it and adjudicating a decision. Most of the cost is for manpower, but there will also be travelling expenses and computer time as major items. The real challenge is to find a version which can do what the rate-base-rate of return system can do, but do it at a thousandth, or less, of the cost.

APPENDIX 2-1

ANALYSIS OF CONSTRAINED PROFIT MAXIMIZATION IN A MARGIN CONTROL SETTING

Theorem A profit maximizing firm producing under a margin constraint will produce at a suboptimal capital labour ratio.

Comment This is a variation of a well-known result of Averch and Johnson (1962). The original theorem applies to firms operating under a rate of return constraint.

Proof Consider a firm operating under the production function

$$q = f(x_1, x_2) \tag{1}$$

where x_1, x_2 are the inputs of labour and capital respectively. Then the cost function of the firm is

$$C = wx_1 + rx_2 \tag{2}$$

Unconstrained maximization of the profit function

$$\Pi = pf(x_1, x_2) - C \tag{3}$$

which can be rewritten

$$\Pi = pf(x_1, x_2) - wx_1 - rx_2 \tag{3a}$$

is accomplished by satisfying the following first order conditions

$$\frac{\partial \Pi}{\partial x_1} = pf_1 - w = 0 \tag{4}$$

$$\frac{\partial \Pi}{\partial x_2} = pf_2 - r = 0$$

and the usual second-order conditions.

The first order conditions yield the following standard condition on the marginal rate of substitution of labour for capital

$$\frac{f_1}{f_2} = \frac{w}{r} \tag{4a}$$

The profit margin constraint requires that profit, including any return on capital, not exceed a fraction $\underline{k}$ of total revenues. For obvious reasons, it will be satisfied as an equality so that we have

$$pf(x_1,x_2) - wx_1 = kpf(x_1,x_2)$$

or

$$(1-k)pf(x_1,x_2) - wx_1 = 0 \tag{5}$$

where $k < 1$.

The constrained maximization problem becomes

$$\max L = pf(x_1,x_2) - wx_1 - rx_2 - \lambda[(1-k)pf(x_1,x_2) - wx_1]$$

which is maximized when we satisfy

$$\begin{aligned} \frac{\partial L}{\partial x_1} &= pf_1 - w - \lambda(1-k)pf_1 + \lambda w = 0 \\ \frac{\partial L}{\partial x_2} &= pf_2 - r - \lambda(1-k)pf_2 = 0 \\ \frac{\partial L}{\partial \lambda} &= (1-k)\, pf(x_1,x_2) - wx_1 = 0 \end{aligned} \tag{6}$$

and the second order conditions.

Rearranging the first equation of (6), we get

$$(1-\lambda + \lambda k)pf_1 - w\,(1-\lambda) = 0$$

or

$$pf_1 = w\left(\frac{1-\lambda}{1-\lambda+\lambda k}\right) \tag{7}$$

where

$$\left(\frac{1-\lambda}{1-\lambda+\lambda k}\right) < 1.0$$

The second equation of (6) yields

$$(1 - \lambda + \lambda k)pf_2 - r = 0$$

or

$$pf_2 = \frac{r}{(1-\lambda + \lambda k} \tag{8}$$

Conditions (7) and (8) yield the following condition on the marginal rate of substitution of labour for capital

$$\frac{f_1}{f_2} = \frac{w(1-\lambda)}{r} \tag{9}$$

Condition (9), together with a declining marginal rate of substitution implies a higher labour-capital ratio than that which holds in the unconstrained case.

APPENDIX 2-2

COMMENT ON THE AVERCH-JOHNSON EFFECT

While the basic propensity of companies regulated on a rate base-rate of return basis to overinvest or "gold-plate" plant is recognized in public utility literature from the 1920's onward, the first formal model of the process is contained in H. Averch and L. Johnson, "Behaviour of the firm under Regulatory Constraint" 52 American Economic Review 1052-69 [1962]. The Averch-Johnson exposition is marred by mathematical errors which do not affect their conclusions. For a correction see W.J. Baumol and A.K. Klevorick, "Input Choices and Rate of Return Regulation: An Overview of the Discussion" 1 Bell Journal of Economics and Management Science 162-190 [Autumn, 1970].

APPENDIX 2-3

THEORY UNDERLYING COST OF FUNDS FORMULAE

(a) Basic Principles

In developing criteria for capital attraction, consider the case of a company which has the simplest capital structure, consisting of nothing but common shares. The reason for approaching the problem from this end is that there is probably more controversy over what constitutes an appropriate rate of return for common than any other source of financing.

The basic requirement is to maintain market values equal to or slightly greater than book value so that additional stock may be sold, if necessary, without diluting existing shareholders' equity. While it is possible to effect isolated sales of common stock below book value, frequent resort to the practice will create anticipations of continuing dilution which will drive stock prices down to the point where additional stock is unsaleable.

There are several theories which purport to explain the way in which corporate earnings are translated into share prices.

One widely-accepted theory equates the current value of a share of stock to the present value of the stream of future dividends which the shareholders expect to receive, capitalized at a discount rate which is referred to in the financial literature as the "cost of capital". For the investor who continues to hold the stock, the dividends are all that he will ever receive. For the investor who expects to sell his shares at some future point in time, the shares' current value will be the present value of the dividends he expects to receive during his holding period, plus the present value of the price

he expects to receive for his shares when he ultimately sells them. But this price, in turn, will be dependent on the dividends the buyer expects to receive, and on the price for which the buyer in turn will ultimately sell them. The analysis can be repeated through any number of buyers. The only return that any of them gets from the company is the dividend. The prices they obtain on selling their shares are paid from one to another and cancel out in the calculation. The value to the short-hold investor must reduce to the same basis as that to the long-term investor; i.e., the present value of expected dividends.

Another view of share valuation, to some extent implicit in the use of price-earnings ratios which are frequently quoted in the financial press, sees the value of a share as the present value of the future earnings attributable to it. Such ratios vary widely, reflecting not only differences in risk as perceived by investors and hence differences in the capitalization rate, but also differences in earnings growth expectations attached to the shares in different companies. However, unless the asset base underlying a share is expanded, earnings are unlikely to grow (except perhaps in the very short run if expanded sales permit the more complete utilization of existing plant). It has been shown that a correct formulation of this version of the share valuation theory equates share value, not to the present value of future earnings, but to the present value of future earnings minus the present value of additional investments which must be made to realize those earnings. There will, in fact, be no "growth premium" in the share price unless the present value of the increment to the company's earnings is greater than the present value of the required investment. Formulated in this

fashion, the expected earnings theory has been shown to be equivalent to the expected dividends theory. A discussion of their equivalence can be found in an article "Dividend Policy, Growth, and the Valuation of Shares", by M.H. Miller and F. Modigliani in the October, 1961 issue of the University of Chicago's Journal of Business.

(b) Capital Attraction - Internal Funds Generation

Consider a company which is earning, and paying out as dividends $1.00 per share, and whose shares are currently selling for $10.00. The asset base is not expanding, and no growth is anticipated in the absence of such expansion. Under these assumptions, the market evidently requires a yield of 10% on the shares, as is found by computing the dividend-to-price ratio. Call this required yield k. Evidently

$$k = \frac{\$\ 1.00}{\$10.00} = .10 \qquad (1)$$

Alternatively, the price may be expressed as the capitalized value of the constant stream of future divdends, with k = .10 as the capitalization rate, i.e.,

$$\text{Price} = \frac{\$1.00}{(1 + .10)} + \frac{\$1.00}{(1 + .10)^2} + \frac{\$1.00}{(1 + .10)^3} + \ldots + \frac{\$1.00}{(1 + .10)^\infty} = \$10.00$$

The above can be expressed more compactly as

$$\text{Price} = \frac{\$1.00}{k} = \frac{\$1.00}{.10} = \$10.00 \qquad (2)$$

This expression for the value of a share may be replaced by an equivalent expression which breaks the total value into two components:

(a) the present value of the dividend to be received at the end of the first year;

(b) the present value of the stream of dividends which begins two years hence.

Thus

$$\text{Price} = \overbrace{\frac{\$1.00}{1.10}}^{(a)} - \overbrace{\frac{1}{1.10}\ \frac{\$1.00}{.10}}^{(b)} \qquad (3)$$

$$= \$\ .91 \quad - \quad \$9.09$$

If we reinvest a portion of this year's earnings rather than paying out all of the earnings as dividends, the effect will be to reduce the numerator of the first term in expression (3) by the amount equal to the sum reinvested, and to add an additional term reflecting the capitalized value of earnings on the additional assets. For the price of the shares to remain unchanged it is necessary that this third term be equivalent in value to the reduction in the value of this year's dividend.

If 40% of the earnings are reinvested, then the reduction in the first term is

$$\frac{(.40)\ \ (\$1.00)}{1.10} = \$.364$$

Unless there is an increase in earnings (and dividends) in subsequent periods the share price would drop by $.364. To maintain the share price, it is evident that the additional assets of $.40 must produce in subsequent periods, a rate of return sufficient, when capitalized to add an offsetting $.364 of value. If earnings on the reinvested funds are at a rate r, the value of the increment to earnings, which starts next period, is given by

$$\text{Value of Increment} = \frac{1}{1.10} \left(\frac{.40r}{.10}\right) \qquad (4)$$

It is evident, by inspection of expression (4) that, in this example, if the additional assets produce a rate of return of 10%, the capitalization rate for growth-free dividend stream), the value of the increment will be $.364 and, as a consequence, the price of $10.00 will be maintained. If a larger rate of return is earned, the price will be enhanced. For example, assume r = .12. Then the value of the increment is

$$\frac{1}{1.10} \quad (.48) \quad = \$.436$$

This is larger than the reduction resulting from the cut in the current dividend, so the value of the share becomes

$10.000	(the original value)
- .364	(the effect of the dividend cut)
+ .436	(the effect of the investment)
$10.072	

The rate of return, 10%, which defines the amount which must be earned to maintain share value, is usually referred to in the financial literature as the cost of capital. It is also the capital-attracting rate, in this instance the rate needed to attract internally-generated funds. As long as this rate can be earned, value will be maintained and no losses will be imposed on shareholders.

(c) Capital Attraction - Externally Raised Funds

The case where additional funds are raised by a new issue of shares is slightly more complex, because the number of shares is now a variable and the analysis can no longer be conducted entirely on a per-share basis. Consider now the case where a company meeting the same conditions assumed above, i.e., $1.00 per share earnings, all distributed, market price $10.00 per share, has 1 million shares outstanding. It wishes to raise and invest $400,000, and to raise the funds by selling shares rather than by reducing the current dividend. Assume for the moment that it is able to sell the shares for the current price of $10.00, without any underwriters' commission or allowance for market pressure. Consequently, after the issue, there will be 1,040,000 shares outstanding.

Before the issue, the company was worth $10,000,000, i.e., the capitalized value of the earnings per share times the number of shares outstanding.

$$(1{,}000{,}000)\ \frac{(\$1.00)}{.10} = \$10{,}000{,}000 \qquad (5)$$

The original earnings stream will remain after the share issue, but it will now be divided among 1,040,000 shares. The per-share value of the original earnings stream will thus be

$$\frac{\$10{,}000{,}000}{1{,}040{,}000} = \$9.615 \qquad (6)$$

There will, of course, be an additional income stream, resulting from the investment of the $400,000 of new funds. The new investment will produce annual earnings of $400,000 times r, where r is the earnings rate expected on it. This earnings stream will be capitalized at the 10% rate. Its present value is

$$\frac{\$400,000r}{.10} = \$4,000,000r \tag{7}$$

On a per share basis, the additional earnings stream will be worth

$$\frac{\$4,000,000r}{1,040,000} \tag{8}$$

For each share to continue to be worth $10.00, the value of this stream must be $.385 to offset the effect of diluting the original income stream and dividing it among a greater number of shares, or the per share price will decline. To produce this value it is necessary for r, the rate of return on the new assets, to equal 10%, as before.

This example assumed no flotation cost. If, in order to raise a net amount of $400,000 it was necessary to sell 44,000 shares, to cover flotation costs, expression (6) would be

$$\frac{\$10,000,000}{1,044,000} = \$9.579 \tag{6a}$$

and the additional income stream, on a per share basis, will be worth

$$\frac{\$4,000,000r}{1,044,000} \tag{8a}$$

For each share to be worth $10.00, the amount in expression (8a) must be $.421. This will be the case if r, the rate of return on the new assets, is 11%. Flotation cost, f, expressed as a fraction of total selling price of the new issue is 9.09%. The resultant cost of capital is the capitalization rate of the no-growth income stream, 10%, divided by 1 minus the flotation cost, i.e.,

$$\frac{k}{1-f} = \frac{.10}{1-.0909} = \frac{.10}{.9091} = 11\% \qquad (9)$$

Except for the complication introduced by flotation cost, the required rate of return on the new investment in the external financing case is identical to that in the internal financing case.

(d) Capital Attraction with Continuing Growth

Both the above examples consider cases where a single investment is made and where all the earnings thereafter are paid out as dividends. While this is the simplest context in which to consider the question of how much earnings are required to attract capital, it is not necessarily the most realistic, particularly for the case of companies which carry on almost continuous capital investment programs.

Consider the example company once again, but this time assume that it must choose between continuing a policy of a 100% dividend payout, fixed dividend, no growth basis and a policy whereby it will invest, this year and every subsequent year, 40% of its earnings, whatever they may be. The remaining 60% will continue to be paid out as dividends. The initial dividend will be cut from $1.00 to

$.60, but it will grow continuously at a rate dependent on the fraction of earnings reinvested and the rate of return earned thereon. Next year's dividend will be $.60 plus $.40r where r is the rate of return on the earnings reinvested, and the succeeding year's dividend will be (1 + .40r) times that amount, and so on. There will be a stream of dividends given by

$$\$.60 + \$.60\ (1 + .40r) + \$.60\ (1 + .40r)^2 + \ldots \text{etc.}$$

The present value, V, of this stream can be found in the usual manner:

$$V = \$.60 + \frac{\$.60\ (1 + .40r)}{1.10} + \frac{\$.60\ (1-.40r)^2}{(1.10)^2} + \ldots \text{ etc.} \quad (10)$$

Providing the discount rate (in this case 10%) is greater than the growth rate (.40r), the above stream has a finite sum which is equal to the initial dividend divided by the discount rate minus the growth rate, i.e.,

$$V = \frac{\$.60}{.10 - .40r} \quad (11)$$

To maintain the share value at $10.00 it is necessary to have a value of r that equates expression (11) with the $10.00 share price. A value of .08, for example, will give

$$V = \frac{\$.60}{.10 - .40(.08)} = \frac{\$.60}{.068} = \$8.82$$

which is too low.

Perhaps not surprisingly, in the light of the previous examples, the rate which does the job is 10% which gives

$$V = \frac{\$.60}{.10 - .40(.10)} = \frac{\$.60}{.06} = \$10.00$$

The required rate of return is still the capitalization rate which would apply to the no-growth dividend stream. However, in the real world situation the dividend stream is unobservable and must be estimated. To facilitate discussion of the estimation procedure, note that expression (11) can be generalized into

$$V = \frac{D_o}{k-g} \tag{12}$$

Where D_o is the current dividend, k is the cost of capital, and g is the rate of growth in earnings (and by assumption of fixed payout, dividends). If V is equated to the market price, all of these variables except k can either be observed or statistically estimated. By inserting values for all other variables, k, which is the "cost of capital" or the "capital attracting rate" may be estimated as well. Substituting the current price per share (P_o) for V and rearranging the terms in expression (12), we get

$$k = \frac{D_o}{P_o} + g \tag{13}$$

where D_o = the current dividend per share

P_o = the current price per share

g = the average rate of growth expected.

Strictly speaking, expression (13) assumes perpetual growth at an unchanging rate. In practice, the rate of growth will vary from one period to the next, but it is possible to interpret g as the average rate likely to prevail over the next few periods. With the ranges of values of g and k which are relevant in the case of most companies, it is not necessary to be concerned over the fact that perpetual growth at the current rate may be unlikely or even impossible. By far the greatest part of the value is accounted for by the first few terms of expression (10), and earnings more than 20 or 30 years in the future have a negligible impact on present values.

References - Chapter 2

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CHAPTER 3

RATE OF RETURN : MEASUREMENT AND IMPLEMENTATION ISSUES

1. Introduction

The purpose of this chapter is to provide perspective on the measurement and implementation issues associated with a regulatory process employing the concept of a fair rate of return to equity investors. Because risk plays a prominent role in the assessment of a fair rate of return, the measurement of risk exposure, as well as the rate of return, is integral to this type of regulatory regime.

Neither risk exposure nor the rates of return required by common equity investors can be observed directly. The measurement process is, therefore, inferential in orientation. It is also technically complex. For this reason the main text contains only the broad outline of the methodology and a discussion of the considerations bearing on its relevance to the rental housing market.

In recent years inflation has had a major impact on both capital values and the rates of return required by investors. Consequently, a section of this chapter is devoted to the implications of changing price levels for implementation of a regulatory system based on rate of return, rate base criteria.

Primarily because of developments on the inflation front, the rates of return required by investors to hold all forms of investment have changed dramatically over the post World War II period. While the overall trend has been upward, substantial changes in both directions have become commonplace. This increased volatility in investors' required rates of return has necessitated a re-orientation of those

regulatory processes utilizing the concept of a fair rate of return. Annual determinations are now the norm in a number of Canadian regulatory jurisdictions.

Perspective on rate of return levels, the magnitude of changes therein and their association with levels of inflation is provided in an appendix to this chapter (3-A). Both the theoretical linkages and the empirical relationships are presented.

2. Estimation of the Rates of Return Required by Equity Investors in Real Estate

(a) Methodological Framework

In Chapter 2 we presented various models for the determination of the investors' required rate of return. In this section we utilize two models to develop estimates of the rate of return required by equity investors in real estate.

Gaps inevitably exist between the data formally required by these models and the data which are actually available. For this reason, it is necessary to include a series of steps in the estimation process rather than moving directly to the item of interest. Moreover, the data limitations have made it necessary to utilize an amalgam of the conceptual models rather than direct estimates from one or more separately.

In summary, the estimation methodology involves the following steps:

(1) Estimation of the rate of return required by investors to invest in a portfolio of low risk, stable corporations. The estimates are based on the "discounted cash flow model" of share price determination.

(2) Estimation of the risks borne by investors in low risk, stable corporations and in publicly traded Canadian property management and property development companies. These estimates are based primarily upon the "capital asset pricing model" of asset price determination.

(3) Utilizing the relative risk values of the stable, low risk companies and of the property management and development companies in conjunction with the required rate of return

estimates of the low risk group to establish the implied rate of return requirements for the real estate group.

Of necessity, the estimation process involves a number of twists and turns. In view of the technical orientation and the unavoidably detailed examination of many data items, the detailed development of steps (1) and (2) of the estimation process is contained in Appendix 3-B.

(b) Applicability of the Methodology to Rental Housing

It is appropriate to consider whether rate of return estimates for publicly traded real estate companies can be applied to investment in rental housing *per se*. As is well known, the publicly traded real estate companies hold portfolios of real estate assets consisting, in widely varying degrees, of raw land, commercial and industrial properties and residential properties. In recent years, some divestment of the latter has occurred and has become, in some cases, a *cause célèbre*.

Because the holdings of the publicly traded companies consist of portfolios of different types of assets, the risk estimate for each company reflects the end-result of two considerations: (1) the risk exposure associated with each type of asset and (2) the emphasis given to each type in the total portfolio. As is perhaps self-evident, should each type of asset held in the corporate portfolio involve a different level of investor risk exposure, the overall risk exposure of the total portfolio will represent a weighted average of the risks of the components.[1]

1. Within the framework of formal "mean-variance" type models of portfolio risk exposure, the weighting of each asset's risk is a rather complex undertaking involving the degree to which the possible outcomes for the assets held are interrelated. For present purposes it is not necessary to elaborate further upon these considerations. For a full elaboration, see William Sharpe, *Investments*, third edition (Prentice-Hall, 1985).

As matters presently stand, the risk estimates available are for the composite activity of the publicly traded companies; estimates of the risks associated with each asset type are not available. However, two possibilities exist for developing estimates for the residential housing component per se.

First, the highly publicized divestment of these properties on a large scale by the publicly traded companies will, in due course, permit the estimation of overall company risk "before" and "after" divestment. While other variables undoubtedly affect the "before" and "after" values, the difference, if any, nevertheless, provides a useful point of departure for what is, in the final analysis, an exercise inevitably involving the application of a substantial amount of judgement.

The second possibility for the estimation of the risk exposure associated with the residential housing component is to evaluate the extent to which differences in the overall risk values of the publicly traded companies are associated with differences in the extent to which their portfolios are comprised of the major asset categories. For this analysis it might be appropriate to estimate the risk values over relatively short periods of time (e.g., one year) and thereby provide additional observations and data which are contemporaneous with the data on portfolio proportions typically provided in the companies' annual financial statements.

Two additional questions need to be addressed in assessing whether risk values for publicly traded real estate shares can be utilized in establishing estimates of investors' required rates of return for

rental housing generally. The first question is whether or not corporate landlords whose shares are publicly traded have the same risk exposure through their investments in residential housing as other landlords, both large and small. The second question is whether or not the required reward per unit of risk depends upon whether the investment is represented by direct ownership of rental housing or by the shares of a publicly held real estate corporation. While definitive conclusions cannot be presented on either question, each is examined below.

On the matter of relative risk exposure of various types of landlords, there appears, in the main, no compelling basis for concluding that meaningful differences exist. On the revenue side, all owners of rental housing are in the business of renting to individuals. All owners therefore accept the risk that their revenues will, from time to time, be affected by an increase in the supply of rental units and an ensuing above average vacancy rate. All owners accept the risk that income tax developments (such as the tax free status of the capital gains associated with the sale of a principal residence or the introduction of the Registered Home Ownership Savings Plan) will increase the relative attractiveness of home ownership. All owners accept the risk that economic conditions may require rents to be reduced even though expense outlays remain constant or increase. While it might be argued that the type and quality of rental accommodation, and hence sensitivity of revenues to economic fluctuations is systematically related to type of landlord, the probable conclusion would be that the larger landlords face the lower risk exposure. The same conclusion would be reached if the relative contribution of the "law of large numbers" to the stabilization of the revenues of large and small landlords were considered.

On the expense side, all landlords must accept the uncertainties associated with operating costs. Maintenance and repair requirements involve uncertainties as to frequency and dollar amounts. Municipal taxes and income taxes (whether corporate or individual) are subject to uncertainty for all landlords both as to rate and to method of determination. On balance, there appears to be no basis on which to conclude that the risks emanating from these sources differ by type or size of landlord.

The issue of whether or not the required rate of return for a given level of risk exposure varies among investors in rental housing cannot be resolved on the basis of factual data. Nevertheless, the theoretical arguments against variation existing appear compelling. At any given point in time there will almost certainly be investors who will be receiving rates of return in excess of what they require for their perceived level of risk exposure. At the same time, there will be others who have the contrary view. As a result, some members of the former group will be willing investors in additional assets while potential sellers will be members of the group which views the risk/return relationship to be unsatisfactory. The ability of investors freely to buy and sell real estate investments, irrespective of the formalities of ownership, should act to keep the risk/return relationships in the various markets in line.

Notwithstanding the strong theoretical arguments for expecting the same risk/return relationships to pertain in the markets for both publicly and privately held real estate, the view is often advanced that the investment preferences of certain investor segments meaningfully affect the rates of return required from certain types of real estate

investments. For example, certain ethnic groups, particularly those whose countries have experienced disastrous inflations and the debasement of monetary assets, are thought to have a strong preference for ownership of real over "paper" assets. For this set of preferences to affect the relationship between the required rate of return and risk (with the latter evaluated in statistical terms) it would be necessary to segment the market for the shares of publicly traded real estate companies from the market for direct private investment in rental housing. While it is very likely that the socio-economic characteristics of the two groups of investors are, on average, quite different thereby creating the potential for different rates of return for a given risk level, it would also be necessary to argue that none of the members of either group was willing to move to the other in response to more attractive risk/return prospects in the other segment. Given the numbers of actual and potential investors familiar with property values (even if only initially through ownership of their own homes) segmentation resulting in different equilibrium required rates of return per unit of risk would seem to be most unlikely.

In similar vein it is sometimes suggested that small landlords may be willing to accept a lower rate of return from their investment in rental housing because of their ability to manage and administer effectively the investment at extremely low cost. Even ignoring the fact that the resulting low cost may be due to imputing a low (perhaps zero) opportunity cost to the time spent in this activity, this ability should affect the risk/return relationship in all real estate markets through the equilibrating mechanism described above.

In summary, it is our view that no compelling reasons exist for differentiating by size or type of landlord for rate of return purposes. There is, however, the unresolved issue of whether or not the risk values determined for the publicly traded real estate companies misstate their risk exposure in rental housing.

A final consideration in assessing the applicability of required rate of return and risk data for publicly traded companies to rental housing investment generally is the relation between the required rate of return on common equity and the extent to which "leverage" is used. It is a fundamental proposition of financial economics that the risk exposure of the common equity investor is affected by the extent of the corporation's indebtedness. The higher the proportion of total invested capital involving financial charges which must be met, the higher the probability that the corporation will find itself financially embarrassed or that the residual income available for the common shareholders will be disappointingly low. The reaction of common shareholders to high levels of prior financial charges; i.e., to high "leverage" will be to require higher rates of return, all other things being equal.

Historically, the Canadian real estate industry has operated with substantial capital leverage. Average capital structures are shown in Appendix 3-C for the real estate group and the two subgroups (property managers and property developers). The capital structures are computed on two bases: (1) using the book value of the common equity and (2) using the market values of the common shares.

Capital structures based on book values (Tables 3-C1, 3-C2 and 3-C3) have, on average over the past five years, incorporated debt ratios

of almost 80 percent. The common equity ratios have averaged only 9.7 percent. Somewhat lower debt ratios materialize when the common equity is measured on the basis of the market value, rather than the book value of the shares. For the last five years the average debt ratio was approximately 69 percent for the entire real estate group, 66 percent for the property manager group and 71 percent for the property developer group (see Tables 3-C4, 3-C5 and 3-C6).

These capital structure data should be borne in mind in any assessment of the appropriate rate of return for investment in real estate common equity inasmuch as these capital structures formed, in part, the basis for the estimated risk values. Real estate investments involving higher common equity ratios than those applicable to the sample companies would, all other things being equal, warrant somewhat lower common equity rates of return.

3. Alternative Regulatory Models and Changing Price Levels

(a) Introduction

Any industry utilizing relatively large amounts of long-lived capital assets per unit of output and financing the acquisition of those assets with large amounts of debt is bound to be affected significantly by major price level changes. It will be so affected whether it is regulated or not, but there can be no doubt that regulation introduces further complications into an already-complicated situation.

In this section we review the likely performance of different regulatory models under a situation in which a burst of inflation is let loose on a previously stable-price situation, and is later allowed to subside. Doing so throws light on the process of transition from a stable price mode to an inflationary mode and back again. The nature of the situations analyzed is such that these disruptive features are thrown into prominence. In our view it is appropriate that they receive more attention than the steady-state aspects of an equivalent system under conditions of constant inflation at a stable rate. The decision to look at these aspects is a deliberate one inasmuch as they are the ones most likely to cause disruptions in the fair treatment of investors in regulated industries.

The present century is without precedent in the magnitude of the inflation experienced in industrialized countries. The reasons for this are not altogether clear; for this reason alone we should not expect any reversion to a more stable price environment. The record, however, is one of episodic inflation, with periods of relatively rapid inflation interspersed with periods of stable prices or even falling prices. This

fact alone suggests that any regulatory system must be as capable of dealing with episodic inflation as with steady-state inflation, as it is more likely that the regulatory system will have to deal with the episodic variety.

The periods of inflation experienced during this century have exhibited, in addition to rising prices, higher interest rates and rising wages. Wages can, of course, be viewed as one price among many that are affected by general inflation. But they are also the prime determinant of the income levels of the employed population, and it is important to note that, to the extent that wages adjust along with other prices, wage earners are hedged against price level changes and are, in general, not harmed by them. Other groups in the economy, such as pensioners and other fixed-income recipients, are harmed by inflation to the extent that the purchasing power of their incomes is reduced.

Interest rates too, are a price and, as discussed earlier, adjust in response to anticipations of inflation. Such anticipations are embodied in new loan contracts, but outstanding contracts are not affected; consequently, unanticipated inflation results in a transfer of wealth from lenders to borrowers.

It is tempting to assume that because inflation is the main danger, it is the only danger. There have been several periods of relatively sharp deflation in the present century, and there is little reason to suppose that the combinations of circumstances which brought them about cannot or will not be repeated. Indeed, some analysts see the debt problems of the third world countries and the major international banks as a situation containing the seeds of a potential serious

deflation. While a deflation may or may not materialize, any regulatory scheme must, in our view, be as capable of operating in a deflationary environment as in an inflationary one.

The following analysis proceeds by way of numerical example. The examples are contrived and constructed so as to throw the features of alternative systems into sharp relief. To do so, we have deliberately sacrificed some "realism" in the sense of resemblance to any particular industry; in particular we have assumed relatively short asset lives in order to keep the size of the examples small enough to be traced through. The conclusions drawn are not tied to the particular numerical values assumed in the examples, however.

(b) Alternative Systems Without Capital Market Adjustment

The purpose of this sub-section is to present a simple basic model of a regulated firm and to trace the effects of an inflation on its economic viability under the assumption that no interest rate or equity yield adjustments take place. The model is deliberately simplified, and is presented in numerical form in order to facilitate exposition. Of necessity the quantitative results depend on the numerical values assumed, but the qualitative results are perfectly general. The assumptions are:

(1) That the investor has 10 identical buildings which were installed 1, 2, 3, ..., 9 years before the period labelled 0 in our analysis.

(2) Capacity is fully utilized and is kept constant by the replacement of one building annually.

(3) Cost of a building is $100,000 in year 0 and has been at that level for a decade.

(4) Depreciation is taken at 10 per cent on a straight line basis. Net assets in year 0 are, therefore, $550,000.

(5) The price level has been constant for at least 10 years prior to year 0. Starting in year 1, the price level and the replacement cost of a building rise at an annual rate of 10 per cent for 5 years. After 5 years, the price level and the replacement cost of a building are stabilized at the fifth year level.

(6) Allowed earnings are adjusted annually to allow a permitted rate of return on a rate base. There is no other regulatory lag.

(7) For simplicity, there is no corporate income tax.

Several cases are examined, in which the rate base and/or depreciation provision is assumed to be determined on different principles, or in which alternative financing alternatives are explored. In the present subsection the rate of return is assumed to be fixed at 8 per cent. (Alteration of the rate in response to capital market changes is considered in the next subsection.) The 8 per cent rate can be construed as either an 8 per cent equity return on an all-common share capital structure or the average of a 6 per cent debt cost and a 10 per cent equity cost for a 50-50 capital structure.

The observed historic cost of new buildings and the resulting historic-cost depreciation charges are summarized in Table 3-1. It will be noted that while the replacement cost of assets is stabilized after year 5, the depreciation charge does not stabilize until the 14th year; i.e., until after all assets purchased before the attainment of the ultimate price level have been retired. Consequently, additional funds must

be found to replace buildings in each of the years 1-14 inclusive.[1] The first two cases consider the consequences of alternative methods of financing these additional funds requirements.

Case 1 - Original Cost - All Equity Financing

In this case, the net asset account grows as shown in columns 1, 2 and 3 of Table 3-2; net earnings at 8 per cent of average net assets are as calculated in column 4 of the table. Column 6 shows the balance of earnings available for dividends on the assumption that the additional equity funds required to replace the investment (column 5) are obtained by reducing the dividend; the dividends are expressed in the last column of Table 3-2 as a rate of return on the historical cost or book value of the shareholders' equity. The values in this column show that, even though the rate of return component of rates is held constant at 8 per cent, the dollar amount available for distribution to shareholders actually falls until year 6 under this alternative. The remainder of the 8 percentage points of return is represented by the earnings retained to finance the additional investment.

Alternatively, of course, the additional funds could be obtained by selling more shares. In this case, the total dividend is not reduced and remains at 8 per cent. The share of original shareholders is, however, progressively diminished, as more and more stock is oustanding. If the

1. There is nothing about the rate base/rate of return approach which requires that the depreciation charge be large enough to finance the replacement of the depreciated building. The important consideration is that the sum of depreciation charges and the nominal rate of return on investment be large enough to permit the investor to recoup all of his originally invested purchasing power and his required real rate of return (on unrecovered principal) over the life of asset. In the examples presented in this sub-section, the absence of an adjustment to the nominal rate of return to compensate for inflation results in an insufficient recovery.

new stock is sold at book value (which is an assumption that we will be unable to retain in the next sub-section) the available dividend remains at 8% of the historic investment, of both old and new shareholders.

However, investors are not able to pay their rent, buy their food nor take holidays with nominal yields on historical investment, nor is historical investment an accurate measure of the sacrifices in purchasing power contributed by those whose investments were made at different dates. Table 3-3 shows the rate of return and dividend available under the assumptions of Table 3-2, computed as a percentage of current dollar investment, computed by revaluing original investment in each year using the price index of the year in question. While the rate of return ultimately reaches 8 per cent on the historic costs of the assets acquired at the higher price levels, these assets, which under the assumptions of this example yield identical services to the initial assets, are acquired only by making an additional investment.

This example is an indirect answer to the question of whether shareholders are adequately protected in a period of inflation by allowing them to earn, on higher-priced assets from the time these assets are acquired, a fixed rate of return not reflecting inflation. The answer is that, in general, they are not.

This conclusion is not the consequence of the choice, for this example, of the retained earnings financing mode. Note that the ultimate real rate of return of 5.6 per cent which appears in Table 3-3 would be identical at least as regards shareholders as a group, if external financing had been used instead of retained earnings, since all that is relevant in its determination is the amount contributed by the group and when the respective contributions were made. Note, however, that,

if shares were in fact sold at book value continuously, the original shareholders would have contributed $550,000 of the 14th year closing book value of $824,735 (Table 3-2) or 66.9 per cent of the total, and will obtain a corresponding percentage of the dividend; i.e., $44,000. Their investment, in current dollars, is $550,000 x 1.6105 or $885,755. Thus, the real return to the original shareholders under this variation is a mere 4.97 per cent. New shareholders get the rest. Sales of common stock at book values which do not result in any dilution on a historic cost basis will still lead to dilution on a current dollar basis during or after an inflationary period if an original cost rate base is used.

Unless something is changed, use of an original cost rate base leads inevitably to a reduction in the real purchasing power of shareholders if there is inflation. The extent of the reduction will be dependent on the choice of financing methods, as well as on the extent of the inflation, and will in general be less initially, but worse ultimately, with internal financing.

Case 2 - Debt Financing

Case 1 assumed that the firm was financed entirely with common stock equity and that the additional funds needed to finance the maintenance of real capital were provided in equity form. Advocates of original cost for rate base purposes point out that regulated companies finance a great deal of their assets with debt and that bondholders are content with repayment on a historical cost basis. Is it not more realistic to assume debt financing?

Obviously, there is some sense in which it is. The insertion of a fixed percentage of debt into the capital structure does reduce the extent to which inflation reduces nominal and/or real returns to shareholders. But, unless the debt ratio is 100 per cent, and the firm operates

without any equity (in which case no problem arises), there will in general be an effect of the type indicated above. Use of debt may permit the equity investment required to maintain capital to be financed without recourse to outside financing, and may otherwise reduce the extent of the penalty imposed on the shareholder, but that is all.

For a limited period it may be possible to avoid cutting back on the dividend or engaging in outside equity financing by borrowing all of the funds required to maintain capital. Table 3-4 shows this alternative. The firm is assumed to start with a 50 per cent debt ratio and to be able to borrow at 6 per cent as required to finance "additions" to plant. This permits the return on shareholders' historic investment to rise, though not enough to maintain the rate of return at its original level on "current dollar" real investment (Table 3-5). But asset coverage and earnings coverage of the debt are decreased, and the risk characteristics of the underlying equity are also correspondingly altered. Some reduction in real return on equity is unavoidable within the range of available debt ratios. This practise is further undesirable as it may lead to the exhaustion of borrowing capacity and create future financing difficulties.

Case 3 - Original Cost with Replacement Cost Depreciation

A variant within the original cost framework (but barely so) is to use original cost in determining permitted net income but to use replacement cost depreciation as an expense in setting rates. While such an approach is not notable for its consistency in an accounting sense, the sums so charged could be credited to a depreciation reserve to the extent that they reflect historic costs and to an "inflation reserve" or similarly labelled catchall account to the extent that replacement costs exceeded historic costs. The advantage is that they would permit replacement investments to be financed as they are made without forcing any

reduction in dividends or new external financing. This would avoid the extreme reduction of funds available for shareholders evident in Table 3-2 but would leave earnings and dividends frozen at 8 per cent on an historic cost basis. Shareholders would still suffer an unwelcome shrinkage in the purchasing power of their investment. The basic reasons for accepting such a policy are pragmatic ones, having to do with possible capital market adjustment to be induced thereby; and further discussion of this variant is postponed until we deal with capital market adjustments in the next section. This alternative appears in Table 3-6.

Case 4 - Replacement Cost Throughout

In this alternative, historic cost is replaced by current cost in the rate base and in the depreciation component of operating expense. Its application to the all-equity case is shown in Table 3-7. Funds from depreciation are adequate to provide replacements, so the full amount of earnings is available for dividends. Despite the fixed rate of return, earnings keep pace with inflation due to the revaluation of the rate base. In this case, and in this case alone among those we have considered to this point, no loss is imposed on shareholders.

(c) Capital Market Adjustments and Economic Viability

The discussion in the above sub-section is deliberately unrealistic but it is useful as showing the consequences of failure to adjust either the rate base or rate of return in response to inflation. It is unrealistic because, under the regulatory regimes implicit in Cases 1 and 2, at least, investors would in all probability be unwilling to provide funds with which to maintain capital in the face of a promised rate of return which is below the expected rate of inflation. The picture presented above would be realistic only if the inflation was entirely

unexpected and if investors continued to behave throughout as if they expected the price level to remain unchanged at its existing level. While isolated bursts of inflation may well be unexpected, and even major inflations may be unforeseen until they are under way, experienced inflation generates expectations of more inflation and these expectations are, as discussed in an earlier section, reflected in the prices bid for financial assets in the capital market. In the normal course of regulation, these alterations in bids might be expected to reflect themselves in allowable rates of return, reducing the impact of the inflation on economic viability.

As was noted in an earlier section, investors can be expected to incorporate, in their required rates of return, an allowance for the consensus forecast of the rate of inflation. Because the consensus value will almost certainly prove to be incorrect, investors are likely to incorporate a further element in their required rates of return as compensation for the risk that actual inflation will exceed the forecast level. For simplicity, it has been assumed in this analysis that the course of the inflation is correctly anticipated from the moment it starts, and to trace the capital market adjustments that will take place under this assumption. It is assumed that the real rate of return required is 8 per cent on common stocks and 6 per cent on bonds.

The nature of the adjustment is easily computed in the case of a one-year bond, which carries a coupon rate of 6 per cent. At the end of one year, the investor will receive $106.00. If the real return requirement is 6 per cent and ten per cent inflation is expected investors will bid an amount

$$P = \frac{\$106.00}{(1.10)(1.06)} = \$90.90$$

for the bond. The nominal rate of return will be given by

$$\left\{\left(\frac{106.00}{90.90}\right) - 1.0\right\} \times 100 = 16.6\%$$

The determination of the required adjustments in the case of common stock is more difficult because there is no maturity date. Under our assumptions that inflation ends after 5 years, and that the required real rate of return is 8 per cent, it is possible to compute a market value for a date in the period after income and the flow of dividends has stabilized and to work backward from that to determine year by year values and yields.

The earliest suitable starting point is in year 14. In this year, and thereafter, the indicated dividend is $65,979. At a required rate of return of 8 per cent, this stream of dividends has a capitalized value of $824,735, as at the start of year 14 or the end of year 13. Taking this value as at the end of year 13, and adding to it the dividends of $64,456 expected for year 13, we get a gross value of $889,191 as at the end of year 13. The present value of this sum is $823,325 as at the beginning of year 13 or the end of year 12. It is possible to work backward to the beginning of period 0, computing initial and ending values for each period, as we have done in Table 3-8. Note that in years 1-5, the nominal required rate of return is set at 18.8 per cent which is simply

$$100\ [(1.10)(1.08) - 1]$$

Note that in periods 0 to 14 (and beyond) investors receive their required nominal rates of return. Thus, in period 2 we have a holding

period return of 18.8%, derived as follows:

$$\frac{442,789 + 27,536}{395,896} - 1 = .188$$

The dividend of $27,536 accounts for 7.0 percentage points of return on the opening market price of $395,896; the rest is accounted for as a capital gain.

Note, however, that something had to give; in this case the something was the opening market value at the beginning of period 1, which is well below the book value, or the amount invested ($376,861 vs $550,000). Given the expectation of inflation during periods 1 to 5, holders of the asset at the time the inflation anticipations originated (before period 0 in our example) suffered enough of a capital loss to permit subsequent owners to earn an appropriate yield on market value.

If, however, market-dictated rates of return -- 8 per cent in period 0 and after period 5, 18.8 per cent in the periods during inflation -- are allowed, we generate the dividend stream computed in Table 3-9. In Table 3-10, we present a calculation of market values for this case, done on the same basis as Table 3-8. This time the estimated market values are (slightly) in excess of the year end book values. Investors receive their required rates or return but without imposing a collapse of market value below book value in the face of anticipated inflation.

Table 3-11 shows the market value calculations, this time for the case where a nominal rate of return is applied to a replacement cost rate base (Case 4). In this instance, market values are in excess of replacement costs until the 14th year. Note that the valuation tables give values for the beginning and end of each year; because allowed returns are based on mid-year rate bases and are larger than required

to generate an equivalent return on the opening balances in the asset accounts, the result is values slightly in excess of book (original cost case) or replacement value (replacement value case).

(d) Debt Financing With Market Adjustments

In practise, most regulated companies employ debt financing in addition to common equity. Our earlier examples involving debt financing assumed a constant interest rate throughout; in reality, interest rates adjust to expected inflation along with equity yields. Most fixed assets are financed using long term debt; using short term debt creates a maturity mismatch which can lead to serious financial problems in a credit crunch and is rightly regarded as imprudent. While recent capital market conditions have led to the introduction of a variety of floating-rate instruments which contain some of the features of both short term and long term debt, it seems more reasonable to assume that long term, fixed-rate debt will continue to be the financing vehicle of choice in the future, as it has been in the past. We further assume that the issues have a term of 10 years; i.e., coincident with the life of the assets they financed, with 10 per cent of the original issue being retired each year. It is assumed that the debt-equity financing ratio is 50-50, and that interest rates rise when inflation of 10 per cent per annum is expected to commence, from 6 to 16.6 per cent. Equity costs are assumed, on similar grounds, to rise from 10 to 21 per cent. Embedded debt costs are, of course, only 6 per cent; the higher rate applies to the new financing undertaken each year as old assets are replaced.

Table 3-12 shows the embedded debt cost, computed on the assumption that needed increases in debt are financed before the new year and are fully reflected in the cost of

capital for the year. Table 3-13 shows cost of service, embodying a 10 per cent cost of equity capital in year 0 and in years 6-14; and a 21 per cent equity cost in the years 1-5, reflecting expectations of inflation. These amounts can be compared with the earnings component for an all-equity-financed company as shown in Table 3-9. The effect of embedded debt is to prolong the impact of the high interest rates experienced during the inflationary period. In a practical situation this effect might be mitigated somewhat by the possibility of refunding at a lower rate.

If we move to a replacement cost base, as in Table 3-7, and continue to apply a "real" rate of return of 8 per cent, but finance with debt, we obtain the results shown in Table 3-14. Table 3-15 shows the impact of debt financing on interest coverages in the replacement cost case. Two related points emerge from the analysis of Tables 3-14 and 3-15. The first is that the combination of debt denominated in nominal dollars, at market-related interest rates, with a replacement cost rate base generates a sharp reduction in interest coverages during inflationary periods, and particularly during the early stages of inflation. This is because required market yields on the debt increase by the amount of the inflation rate, while revenues are only increased in proportion to the inflation that has taken place. The reduction in coverage shown in Table 3-15 is moderate, but this reflects the assumption of a 50 per cent debt ratio; with higher leverage ratios the reduction would be more serious, and could well eliminate any safety margin on interest payments. This basic incompatibility also has an impact on the residual return available on equity, which falls well below required rates during the period of inflation, whether calculated on an original cost basis or on

replacement costs. This in turn will force values below replacement cost and will destroy any incentive to invest.

The basic problem arises because of the incompatibility between a fully indexed system, which a replacement cost system is, and the use of nominally-denominated debt. Theoretically, this problem could be resolved by using indexed bonds or indexed mortgages. Such instruments, however, are rarely used in the North American capital market, and would be suspect if issued by a private issuer because of concerns over the ability of such an issuer to make good on the promises explicit in such a contract. This concern would be particularly acute in respect of securities backed by nothing but rent-controlled real estate.

(e) Effects of Deflation

We have not made counterpart examples to those presented above for a deflation case. They are scarcely necessary. The existence of significant volumes of debt to be serviced provides a major constraint on the ability of any system to reduce rents in the face of deflationary periods of any degree of severity or duration. The problems inflation poses for the replacement cost model would also be posed by deflation; this time it would be the residual debt issued at the former price level and interest rate, rather than the new debt, which would pose the problem. Allowable returns under an historical or original cost rate base would remain adequate to service debt; however, the deflation-induced shifts in the demand at a given nominal price raises real doubts about the ability of landlords to find tenants willing to pay rents at the allowed level. Prolonged deflation would reduce market clearing rents, probably below the regulated level, and would also, in all likelihood, increase

vacancy rates. Landlords would have rental incomes reduced, and would have corresponding difficulties in servicing their outstanding debt. In all likelihood, the experiences of the last major deflationary cycle, during which many landlords lost property to their creditors, would be repeated. There is no way in which rent controls, however devised, can shield a landlord from the risk of deflation.

(f) Effects on Land Values and Asset Lives

The relevant tables here are Tables 3-10 and 3-11 which show the values of assets subject to regulation. Use of a replacement cost base (Table 3-11) would result in a situation in which values tracked replacement costs, or market values of land. Any effects on the prices of competing assets, e.g., real estate for owner-occupancy, would be second-order only, and there would be no particular incentive to accelerate demolition. With an original cost rate base (Table 3-10) market values would closely track book values, and properties would be marketable, but only on a book value basis.

Eventually, as the cost of the building was depreciated, the value would reduce to the cost of the land. Regulation on this basis would have a dampening effect on increases in the value of real estate for owner occupancy, and would presumably reduce the rate of appreciation in land values accordingly. However, to the extent that it did not entirely eliminate such appreciation, a situation would result in which a vacant site at market values could well be worth more than an occupied, rented site at book value. If the amount of such excess value exceeded demolition costs, demolition could be expected to result regardless of the age and condition of the building. Demolition and sale would, in most

instances, result in replacement with a new rental structure, so no net loss of units need be involved. The average economic life of a building would, however, be shorter than it is in an unregulated setting. This effect could be prevented by regulations preventing premature demolition. However, such regulations would be likely to encourage accelerated deterioration in the stock as the legal alternative to demolition, and would prevent desirable supply adjustments, as well as undesirable ones, from taking place. For this reason, such regulations cannot be recommended.

A further alternative is the use of a split-inventory system in which land is valued at market for rate base purposes while buildings are kept on an original cost basis. This solution represents a compromise between use of an original cost rate base and a replacement cost base. It would discourage premature demolition. It would, however, impose significant real costs in terms of the complexity of the resulting regulatory scheme and the costs of working the regulatory system. Moreover, it is doubtful whether most landlords keep records in the detail necessary to apply such a system.

TABLE 3-1

HISTORICAL COST: INVESTMENT AND DEPRECIATION ACCRUALS

Year	Replacement Investment	Depreciation Expense
0	$ 100,000	$ 100,000
1	110,000	101,000
2	121,000	103,100
3	133,100	106,410
4	146,410	111,051
5	161,050	117,156
6	161,050	123,261
7	161,050	129,366
8	161,050	135,471
9	161,050	141,576
10	161,050	147,681
11	161,050	152,786
12	161,050	156,791
13	161,050	159,586
14 and thereafter	161,050	161,050

TABLE 3-2

ALLOWED RETURN, DIVIDENDS AND RETAINED EARNINGS - CASE 1

(Original Cost, All-Equity Financing,
with Retained Earnings)

Year	Net Assets			Allowed Return @ 8%	Retained Earnings	Dividend		Retained Earnings (5) as % of (3)
	Opening	Closing	Average			$	as % of (3)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
0	$550,000	$550,000	$550,000	$44,000	$ 0	44,000	8.00	0.00
1	550,000	559,000	554,500	44,360	9,000	35,360	6.38	1.62
2	559,000	576,900	567,950	45,436	17,900	27,536	4.84	3.16
3	576,900	603,590	590,245	47,220	26,690	20,530	3.47	4.53
4	603,590	638,959	621,274	49,702	34,369	14,333	2.31	5.69
5	638,959	682,853	660,906	52,872	43,894	8,978	1.36	6.64
6	682,853	720,642	601,748	56,140	37,789	18,351	2.62	5.38
7	720,642	752,326	736,484	58,919	31,684	27,235	3.70	4.30
8	752,326	777,905	765,116	61,209	25,579	35,630	4.66	3.34
9	777,905	797,379	787,642	63,011	19,474	43,537	5.53	2.47
10	797,379	810,748	804,213	64,337	13,369	50,968	6.34	1.66
11	810,748	819,012	814,880	65,190	8,264	56,926	6.99	1.01
12	819,012	823,271	821,141	65,691	4,259	61,432	7.48	0.52
13	823,271	824,735	824,003	65,920	1,464	64,456	7.82	0.18
14	824,735	824,725	824,735	65,979	0	65,979	8.00	0.00

Note that the total dollar return to the investor is equal to the sum of columns (5) and (6). Consequently, the investor's total return, in percentage terms is equal to the sum of columns (7) and (8). In the example, this sum is always equal to 8.0%, the allowed rate of return (column 4).

TABLE 3-3

RETURNS ON INVESTMENT IN CURRENT DOLLARS - CASE I

(Historical Cost Pricing - All Equity Financing)

Year	Closing Investment, Historical$ (1)	Investment During Year Historical$ (2)	Price Increase (3)	Previous Year's Closing Inv. in Current $ (4)	Closing Investment Current $ (2) + (4) (5)	Dividend (6)	Dividend yield [100x (6) ÷ (5)] (7)	Retained Earnings (8)	Retained Earnings (8) as % of (5) (9)	Total Return [(6) + (8)] as % of (5) (10)
0	$550,000		0 %		$550,000	$44,000	8.00	$ 0	0	8.00
1	559,000	$9,000	10	$605,000	614,000	35,360	5.76	9,000	1.47	7.23
2	576,900	17,900	10	675,400	693,300	27,536	3.97	17,900	2.58	6.55
3	603,590	26,690	10	762,630	789,320	20,530	2.60	26,690	3.38	5.98
4	638,959	34,369	10	868,252	902,621	14,333	1.59	34,369	3.81	5.40
5	682,853	43,894	10	992,883	1,036,777	8,978	0.87	43,894	4.23	5.10
6	720,642	37,789	0	1,036,777	1,074,566	18,351	1.71	37,789	3.52	5.23
7	752,326	31,684	0	1,074,566	1,106,250	27,235	2.46	31,684	2.86	5.32
8	777,905	25,579	0	1,106,250	1,131,829	35,530	3.15	25,579	2.26	5.41
9	797,379	19,474	0	1,131,829	1,151,303	43,537	3.78	19,474	1.69	5.47
10	810,748	13,369	0	1,151,303	1,164,672	50,968	4.38	13,369	1.15	5.53
11	819,012	8,264	0	1,164,672	1,172,936	56,926	4.85	8,264	0.70	5.55
12	823,271	4,259	0	1,177,936	1,177,195	61,432	5.22	4,259	0.36	5.58
13	824,735	1,464	0	1,177,195	1,178,659	64,456	5.47	1,464	0.12	5.59
14	824,735	0	0	1,178,659	1,178,659	65,979	5.60	0	0	5.60

TABLE 3-4

AVAILABLE RETURNS AND DIVIDENDS - CASE 2

(Original Cost, Replacements Financed with Debt)

Year	Average Net Assets	Debt	Allowed Return @ 8% a/	Interest @ 6%	Dividend		Coverages	
					Total	b/	Interest (3) ÷ (4)	Debt (1) ÷ (2)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
0	$550,000	$275,000	$44,000	$16,500	$27,500	10.00%	2.67x	2.00x
1	554,500	279,500	44,360	16,770	27,590	10.03	2.65	1.98
2	567,950	292,950	45,436	17,577	27,859	10.13	2.58	1.94
3	590,245	315,245	47,220	18,915	28,305	10.29	2.50	1.87
4	621,274	346,274	49,702	20,776	28,956	10.52	2.39	1.79
5	660,906	385,906	52,872	23,154	29,718	10.81	2.28	1.71
6	701,748	426,748	56,140	25,604	30,536	11.10	2.19	1.64
7	736,484	461,484	58,919	27,689	31,230	11.36	2.13	1.60
8	765,116	490,116	61,209	29,407	31,802	11.56	2.08	1.56
9	787,642	512,642	63,011	30,759	32,252	11.73	2.05	1.54
10	804,213	529,213	64,337	31,753	32,584	11.85	2.03	1.52
11	814,880	539,880	65,190	32,393	32,797	11.93	2.01	1.51
12	821,141	546,141	65,691	32,768	32,923	11.97	2.00	1.50
13	824,003	549,003	65,920	32,940	32,980	11.99	2.00	1.50
14	824,735	549,735	65,979	32,984	32,995	12.00	2.00	1.50

a/ On average net assets, at original cost.

b/ Expressed as percent of historical investment of $275,000.

TABLE 3-5

RETURNS ON INVESTMENT IN CURRENT DOLLARS - CASE 2

(Original Cost, Replacements Financed with Debt)

Year	Price Level	Investment-Current $	Dividend	Dividend as % of (2)
	(1)	(2)	(3)	(4)
0	100.00	$275,000	$ 27,500	10.00%
1	110.00	302,500	27,590	9.13
2	121.00	332,750	27,859	8.27
3	133.01	366,025	28,305	7.73
4	145.41	402,628	28,956	7.19
5	161.05	442,891	29,718	6.71
6	161.05	442,891	30,536	6.89
7	161.05	442,891	31,230	7.05
8	161.05	442,891	31,802	7.18
9	161.05	442,891	32,252	7.28
10	161.05	442,891	32,584	7.36
11	161.05	442,891	32,779	7.40
12	161.05	442,891	32,923	7.43
13	161.05	442,891	32,980	7.44
14	161.05	442,891	32,995	7.45

TABLE 3-6

RETURNS ON INVESTMENT - HISTORICAL AND CURRENT - CASE 3

(All Equity Financing, Replacement Cost Depreciation, Return Applied to Historical Cost)

Year	Investment		Dividends = Earnings	Dividend as % of	
	Historical $	Current $		historical $ investment	current $ investment
0	$550,000	$ 550,000	$44,000	8.00 %	8.00 %
1	554,500	614,000	44,360	8.00	7.22
2	567,950	693,300	45,436	8.00	6.56
3	590,245	789,320	47,220	8.00	5.98
4	621,272	902,621	49,702	8.00	5.50
5	660,906	1,036,777	52,872	8.00	5.10
6	701,728	1,074,566	56,140	8.00	5.22
7	736,484	1,106,250	58,918	8.00	5.33
8	765,116	1,131,829	61,209	8.00	5.40
9	787,642	1,151,303	63,011	8.00	5.47
10	804,213	1,164,672	64,337	8.00	5.52
11	814,880	1,172,936	65,190	8.00	5.56
12	821,141	1,177,195	65,691	8.00	5.58
13	824,003	1,178,659	65,920	8.00	5.59
14	824,735	1,178,659	65,979	8.00	5.59

TABLE 3-7

RETURNS ON INVESTMENT - CASE 4

(All-Equity Financing, Replacement Cost Rate Base, Replacement Depreciation, 8% Return)

Year	Investment - Current $	Dividends = Earnings	Dividend as % of Current $ Investment
0	$ 550,000	$ 44,000	8.00%
1	614,000	49,120	8.00
2	693,300	55,464	8.00
3	789,320	62,346	8.00
4	902,621	72,210	8.00
5	1,036,777	82,942	8.00
6	1,074,566	85,965	8.00
7	1,106,250	88,500	8.00
8	1,131,829	90,546	8.00
9	1,151,303	92,104	8.00
10	1,164,672	93,174	8.00
11	1,172,936	93,834	8.00
12	1,177,195	94,176	8.00
13	1,178,659	94,293	8.00
14	1,178,659	94,293	8.00

TABLE 3-8

CALCULATION OF MARKET VALUE
ADJUSTMENTS - ORIGINAL COST, 8% RETURN

Year	Ending Value (1)	Dividends Received (2)	Total (1) + (2) (3)	Present Value Factor (4)	Initial Value (5)
0	$ 363,010	$ 44,000	$ 407,010	1.08	$ 376,861
1	395,896	35,360	431,256	1.188	363,010
2	442,789	27,536	470,325	1.188	395,896
3	505,504	20,530	526,034	1.188	442,789
4	586,206	14,333	600,539	1.188	505,504
5	687,434	8,978	696,412	1.188	586,206
6	724,078	18,351	142,429	1.08	687,434
7	754,769	27,235	782,004	1.08	724,078
8	779,521	35,630	815,151	1.08	754,769
9	798,345	43,537	841,882	1.08	779,521
10	811,245	50,968	862,213	1.08	798,345
11	819,219	56,926	876,145	1.08	811,245
12	823,325	61,432	884,757	1.08	819,219
13	824,735	64,456	889,191	1.08	823,325
14	824,735	65,979	890,714	1.08	824,735

TABLE 3-9

ALLOWED EARNINGS USING MARKET-ADJUSTED
RATES OF RETURN - ORIGINAL COST RATE BASE

Year	Rate Base	Rate of Return	Earnings	Investment	Dividend (3) - (4)
	(1)	(2)	(3)	(4)	(5)
0	$550,000	8.00%	$ 44,000	$ 0	$ 44,000
1	554,500	18.80	104,246	9,000	95,246
2	567,950	18.80	106,775	17,900	88.875
3	590,245	18.80	110,966	26,690	84,276
4	621,274	18.80	116,800	34,369	82,431
5	660,906	18.80	124,250	43,894	80,356
6	701,748	8.00	56,140	37,789	18,351
7	746,484	8.00	58,919	31,684	27,235
8	765,116	8.00	61,209	25,579	35,530
9	787,642	8.00	63,011	19,474	43,537
10	804,213	8.00	64,337	13,369	50,968
11	814,880	8.00	65,190	8,264	56,926
12	821,141	8.00	65,691	4,259	61,432
13	824,003	8.00	65,920	1,464	64,456
14	824,735	8.00	65,979	0	65,978

TABLE 3-10

CALCULATED MARKET VALUES
USING MARKET-ADJUSTED RATES OF RETURN
ORIGINAL COST RATE BASES

Year	Ending Value	Dividends Received	Total (1) + (2)	Present Value Factor	Initial Value
	(1)	(2)	(3)	(4)	(5)
0	$559,252	$44,000	$603,252	1.08	$558,567
1	569,145	95,246	664,391	1.188	559,252
2	587,269	88,875	676,144	1.188	569,145
3	613,400	84,276	697,676	1.188	587,269
4	646,288	82,431	728,719	1.188	613,400
5	687,434	80,356	767,790	1.188	646,288
6	724,078	18,351	742,429	1.07	687,434
7	754,769	27,235	782,004	1.08	724,078
8	779,521	35,530	815,151	1.08	754,769
9	798,345	43,537	841,882	1.08	779,521
10	811,245	50,968	862,213	1.08	798,345
11	819,219	56,926	876,145	1.08	811,245
12	823,325	61,432	884,757	1.08	819,219
13	824,735	64,456	889,191	1.08	823,325
14	824,735	65,978	890,713	1.08	824,735

TABLE 3-11

CALCULATED MARKET VALUES
REPLACEMENT RATE BASE, 8% RETURN

Year	Ending Value (1)	Dividend [a] (2)	Total (1) + (2) (3)	Present Value Factor (4)	Initial Value (5)
0	$ 679,532	$ 44,000	$ 732,592	1.08	$ 669,937
1	758,070	49,120	807,190	1.188	679,532
2	845,124	55,464	900,588	1.188	758,070
3	941,661	62,346	1,004,007	1.188	845,124
4	1,046,483	72,210	1,118,694	1.188	941,661
5	1,160,280	82,942	1,243,222	1.188	1,046,483
6	1,167,138	85,965	1,253,102	1.08	1,160,280
7	1,172,009	88,500	1,260,508	1.08	1,167,138
8	1,175,223	90,546	1,265,769	1.08	1,172,009
9	1,177,137	92,104	1,269,241	1.08	1,175,223
10	1,178,134	93,174	1,271,308	1.08	1,177,137
11	1,178,551	93,834	1,272,384	1,08	1,178,134
12	1,178,659	94,176	1,272,835	1.08	1,178,551
13	1,178,659	94,293	1,172,952	1.08	1,178,659
14	1,178,659	94,293	1,272,952	1.08	1,178,659

a/ From Table 3-7.

TABLE 3-12

CALCULATION OF EMBEDDED DEBT COST,
50% DEBT FINANCING

Year	Total debt	Debt Outstanding @ 16.6%	Debt Outstanding @ 6%	Interest Cost of Debt Outstanding @ 16.6%	Interest Cost of Debt Outstanding @ 6%	Total Embedded Cost (4) + (5)
	(1)	(2)	(3)	(4)	(5)	(6)
0	$ 275,000	$ 0	$ 0	$ 0	$16,500	$ 16,500
1	227,250	54,500	172,750	9,047	10,365	19,412
2	283,975	108,450	175,525	18,003	10,531	28,535
3	295,123	171,795	123,326	28,518	7,400	35,918
4	310,637	214,479	96,158	35,604	5,769	41,373
5	330,453	266,427	64,026	44,227	3,842	48,069
6	350,874	230,822	120,052	38,316	7,203	45,519
7	368,242	201,217	167,025	33,402	10,022	43,424
8	382,558	168,612	213,946	27,990	12,837	40,826
9	393,821	136,007	257,814	22,577	15,469	38,046
10	402,107	103,402	298,705	17,165	17,922	35,087
11	407,440	70,757	336,683	11,746	20,201	31,947
12	410,571	46,642	363,929	7,743	21,835	29,579
13	412,002	22,427	389,575	3,723	23,375	27,098
14	412,368	7,685	404,683	1,276	24,281	25,567

TABLE 3-13

CALCULATION OF RETURN REQUIREMENT
ORIGINAL COST, MARKET YIELDS, 50% DEBT FINANCING

Year	Average Assets	Average Debt and Average Equity	Equity Rate of Return	Equity Return	Embedded Debt Cost a/	Total Return (4) + (5)
	(1)	(2)	(3)	(4)	(5)	(6)
0	$ 550,000	$ 275,000	10.0 %	$ 27,500	$16,500	$44,000
1	554,500	227,250	21.0	47,723	19,412	67,135
2	567,950	283,975	21.0	59,635	28,535	88,170
3	590,245	295,123	21.0	61,976	35,918	97,894
4	621,274	310,637	21.0	65,234	41,373	106,607
5	660,906	330,453	21.0	69,395	43,069	117,464
6	701,748	350,874	10.0	35,087	45,519	80,606
7	736,484	368,242	10.0	36,842	43,424	80,266
8	765,116	382,558	10.0	38,256	40,826	79,082
9	787,642	393,821	10.0	39,382	38,046	77,428
10	804,213	402,107	10.0	40,211	35,087	75,298
11	814,880	407,440	10.0	40,744	31,947	72,791
12	821,141	410,571	10.0	41,057	29,579	70,636
13	824,003	412,002	10.0	41,200	27,098	68,298
14	824,735	412,368	10.0	41,237	25,567	66,804

a/ From Table 3-12.

TABLE 3-14

CALCULATION OF EQUITY RETURNS - REPLACEMENT COST BASE
REAL YIELD 8%, 50% DEBT FINANCING

Year	Allowed Earnings a/	Embedded Debt	Return to Equity	Equity Invested		Return on Equity	
				Original Cost	Replacement Cost b/	Nominal (3) ÷ (4)	Real (3) ÷ (5)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	$ 44,000	$ 16,500	$ 27,500	$275,000	$275,000	10.0%	10.0%
1	49,120	19,412	29,708	277,500	307,000	10.0	9.7
2	55,464	28,535	26,929	283,975	346,650	9.5	7.8
3	62,346	35,918	26,428	295,123	394,660	9.0	6.7
4	72,210	41,373	30,837	310,637	451,310	9.9	6.8
5	82,942	48,069	34,873	330,453	518,389	10.6	6.7
6	85,965	45,519	40,446	350,874	537,283	11.5	7.5
7	88,500	43,424	45,076	368,242	553,125	12.2	8.1
8	90,546	40,826	49,720	382,558	565,915	13.0	8.8
9	92,104	38,046	54,058	393,821	575,652	13.7	9.4
10	93,174	35,087	58,087	402,107	582,336	14.4	10.0
11	93,834	31,947	61,887	407,440	586,418	15.2	10.5
12	94,176	29,579	64,597	410,571	588,597	15.7	11.0
13	94,293	27,098	67,195	412,002	589,330	16.3	11.4
14	94,293	25,567	68,726	412,368	589,330	16.4	11.7

a/ From Table 3-7.

b/ Half of investment in current dollars column, Table 3-6.

TABLE 3-15

EARNINGS COVERAGE ON INTEREST CHARGES
REPLACEMENT COST BASE - 50% DEBT FINANCING

Year	Allowed Earnings Before Interest (1)	Interest Expense (2)	Interest Coverage Ratio (1) ÷ (2) (3)
0	$ 44,000	$16,500	2.66x
1	49,120	19,412	2.53
2	55,464	28,535	1.94
3	62,346	35,918	1.74
4	72,210	41,373	1.74
5	82,942	48,069	1.73
6	85,965	45,519	1.89
7	88,500	43,424	2.04
8	90,546	40,826	2.22
9	92.104	38,040	2.92
10	95,174	35,087	2.66
11	93,834	31,947	2.94
12	94,176	29,579	3.18
13	94,293	27,098	3.48
14	94,293	25,567	3.69

APPENDIX 3-A

HISTORICAL PERSPECTIVE ON THE STRUCTURE OF RETURNS IN FINANCIAL MARKETS

(i) Yields on long term bonds and inflation

Over the post World War II period, dramatic changes have occurred in Canada's economic environment and in the rates of return required by investors to commit funds to all types of investments. In 1950, for example, investors were content to accept an annual yield of somewhat less than four percent to commit funds to long term Government of Canada bonds. By 1981, the required annual yield on these bonds had risen, at one point during that year, more than four-fold, to some 18 percent.

In large part, the changes in investors' required rates of return appear to be attributable to changes in price levels generally. Investors are properly concerned with the purchasing power consequences of an investment. If investors expect an increase in the rate at which price levels will rise, then, all other things being equal, they will also require a corresponding increase in their perspective rate of return, in order to maintain the purchasing power of the funds committed to the investment.

The response of investors to anticipated inflation was first investigated by Irving Fisher,[1] and his basic propositions have since been corroborated by a number of other investigators. The basic position is well summarized by Daryl F. Francis, vice-president of the Federal Reserve Bank of St. Louis:

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[1] Irving Fisher, Appreciation and Interest (1897); The Theory of Interest (1930).

> High and rising market rates of interest go hand-in-hand with a high and accelerating rate of inflation. This is because lenders and borrowers of funds take into consideration their expectations with reference to the future rate of inflation. Lenders desire a market rate of interest which provides them a real rate of return plus a premium based on their expectations regarding the future rate of inflation. Also, during inflation borrowers are willing to pay a higher market rate of interest because they expect the prices of their products to rise, and they wish to avoid the higher construction and other costs associated with delaying new projects. Thus, the interaction of demand and supply in the market for funds during a period of inflation results in market interest rates which embody an inflation premium. (Source: The Federal Reserve Bank of St. Louis Review, August, 1974, p. 2).

The basic finding of these studies is that investors adjust their nominal requirements in the face of expected inflation so that their expected real return is unchanged. Observed market yields reflect, therefore, not only the required real rate of return but a consensus forecast of the rate of inflation.

The historical relationship between changes in price levels and investors' required rates of return is illustrated in Figures 3-A1 and 3-A2. From Figure 3-A2 it is clear that the relationship between required yields and levels of contemporaneous inflation is far from constant. In part, the period-to-period variations are explicable by the fact that investors are concerned with protecting themselves from inflation over the full term of their investment; inflation in any given year may or may not be a good indicator of the rate of price changes over the full term.

A second source of increases in investors' required rates of return is the requirement by investors for compensation to accept the uncertainty as to what future inflation rates might be. On occasion in recent years, the consensus forecast of the rate of inflation has

been wide of the mark with experienced inflation exceeding generally predicted levels by substantial amounts. And even though there has been a substantial drop in inflation rates over the past two years, once-burned risk-averse investors can still be expected to view long-term bonds as currently involving substantially more risk than, say, a decade ago. Several recent studies[1] have established that investors require compensation to accept this type of risk, thereby augmenting their required real rate of return (i.e., the difference between the nominal or observed yield and the anticipated rate of inflation).

The real rate of return currently required by investors in long-term bonds appears to represent a post World War II high. The current nominal yield on long-term Government of Canada bonds of approximately 11 percent provides a prospective before tax real rate of return that is at least twice the historical norm of slightly less than two percentage points.[2] Even if a prospective inflation rate approaching, on

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[1] See Zvi Bodie, Alex Kane and Robert McDonald, "Why Haven't Nominal Rates Declined?" Financial Analysts Journal, March-April 1984, pp. 16-27; William G. Dewald, "Federal Deficits and Real Interest Rates: Theory and Evidence," Federal Reserve Bank of Atlanta Economic Review, January 1983, pp. 20-29; Otto Eckstein and Christopher Probyn, "Why Is The Bond Market Doing So Poorly?" Data Resources U.S. Review, January 1982, pp. 1.9 - 1.13.

[2] Canadian data on realized rates of return appear in: Government of Canada, The Retirement Income System in Canada: Problems and Alternative Policies for Reform, Volume II. For the period 1920-1978 inclusive, the average real rate of return on Government of Canada long term bonds was 1.93 percent (page 10-9). Somewhat lower real rates of return for these bonds over the period 1950-1983 are reported in a recent study by James E. Hatch and Robert W. White. They report an average annual return of -0.31 percent (arithmetic mean) and -0.62 percent (geometric mean). See their study, Canadian Stocks, Bonds, Bills, And Inflation: 1950-1983, Exhibit 5, page 10. (Charlottesville, Va., The Financial Analysts Research Foundation, 1985.)

U.S. data appear in Roger G. Ibbotson and Rex A. Sinquefield, Stocks, Bonds, Bills, And Inflation: Historical Returns (1926-1978). On average, over the period 1926-1978 inclusive, long term U.S. Government bonds yielded an annual return of 3.4 percent while inflation (as measured by the C.P.I.) averaged 2.6 percent resulting in a real rate of return of 0.8 percent (page 12).

average, 7 percent per year over the life of long term bonds is assumed,[1] these bonds would currently provide a prospective real rate of some four percentage points. This amount represents an excess of more than two percentage points over the historical norm.

It is impossible to establish unambiguously the fraction of the prospective real return which represents compensation for accepting the risk that capital losses will be experienced if future inflation (and hence interest rates) were to be higher than the prospective inflation levels that are currently embodied in long-term yields. However, the compensation required by investors for accepting this risk currently appears to be in the range of 1-2 percentage points.

This conclusion is based on two main considerations. First, investors are properly concerned that the massive deficits being faced by the United States federal government and by Canada's federal government have the potential for leading to massive money supply increases and concomitant inflation. Second, in recent years there has been a marked shortening in the length of new financial contracts. That is, investors have, through their interest in retractable and floating rate issues, expressed their reluctance to commit long term at fixed rates. This behaviour demonstrates the uncertainty of investors as to the levels of future inflation and their desire to keep open their options to recontract should inflation move against them in future periods.[2] The research

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[1] In a recent survey of 30 private sector economic forecasts, the Canada Permanent Mortgage Corp. found the generally held view of inflation over the period 1984-1988 to be 5.4 percent (average annual rate).

[2] See A. Steven Holland, "Does Higher Inflation Lead to More Uncertain Inflation?" Federal Reserve Bank of St. Louis Review, February 1984, pp. 15-26, especially p. 16.

on U.S. bond markets cited earlier indicates that this type of risk has, in the recent past, resulted in "lock in" premiums of more than two percentage points. With the free flow of capital and bond issuers between Canada and the U.S., Canadian interest rate levels and movements are closely tied to levels and movements in the U.S. This implies that U.S. research results are basically applicable to Canadian markets also.

(ii) Returns from equity investments

Investors in common stocks are, like investors in long term bonds, concerned with the purchasing power of their investment returns. Consequently, it is reasonable to conclude that the nominal rates of return required by equity investors also increased in conjunction with increases in inflation rates. However, since no returns are promised to investors in common shares, it is impossible to observe the rates of return which they require. Consequently, any conclusions as to the response of equity investors to changes in inflation rates or to particular sources of risk must be based upon indirect measures of their required rates of return. A frequently used method of estimating rates of return required by equity investors has been to estimate, using historical data, the difference in the return required by equity investors and bond investors and to add this estimated amount to the observed yields on bonds. Since the difference is typically estimated on the basis of the rates of return achieved from the two types of investments, an underlying assumption is that the difference required prospectively at a given point in time is equal to the difference achieved over some particular past period. The difficulty in using this approach is perhaps obvious: because the achieved differences often vary widely from one

period to another, the estimated prospective differential will vary with the historical period selected by the analyst.

Analysts typically attempt to mitigate the capricious possibilties inherent in this approach by utilizing the average difference achieved over many periods. Unfortunately, this palliative has the drawback that the economic circumstances of a particular period may warrant a difference that differs considerably from that achieved on average over many periods.

With these important caveats in mind, the data on achieved differences are nevertheless illuminating. Shown in Table 3-A1 are the results of three important studies: one utilizing United States data for the period 1926-1981 inclusive and two based on Canadian data covering some or all of the period 1915-1983 inclusive. These studies clearly show that, historically, broadly based portfolios of common shares have provided, on average, annual compound rates of return which are some 4-7 percentage points above those provided by long term government bonds.

Two relatively recent developments have acted to reduce the premiums required by equity investors. The first development is the set of changes, initiated in 1978 and modified slightly subsequently, in the tax treatment of dividend income. These changes have reduced the premium required to attract taxable investors from long term bonds into common equity investments. The changes proposed in the 1985 federal budget regarding the tax treatment of capital gains would have the same directional effect.

The second development, discussed earlier, is the risks created for investors in long term bonds by increases in the uncertainty as to

future levels of inflation. To the extent that corporations are expected to earn higher than expected rates of return if higher than expected levels of inflation materialize, a corresponding risk premium will not be incorporated in the rates of return required by equity investors. All other things being equal, the premium required by equity investors above long term bond yields would narrow by the differential in the compensation required for inflation uncertainty.

(iii) Illustrative required rates of return, 1950-1985

It is apparent from the foregoing discussion that there is no single rate of return which, if applied at all times and to all types of rental housing, would in all cases be fair. The diversity of rates which would be fair under different circumstances is illustrated in Table 3-A2. None of the particular values has been determined on the basis of specific statistical studies. However, all of the values presented are, in our view, broadly supported by the results of the many statistical studies undertaken over the past decade on various aspects of the determinants of investors' required rates of return.

The table provides estimates of the investors' required rates of return for long term Government of Canada bonds and for equities within three price level environments, all of which have been experienced since 1950. They are:

(1) Inflation currently low with prospective inflation also low and rates of price change expected to be stable. This situation generally prevailed in the mid 1950's.

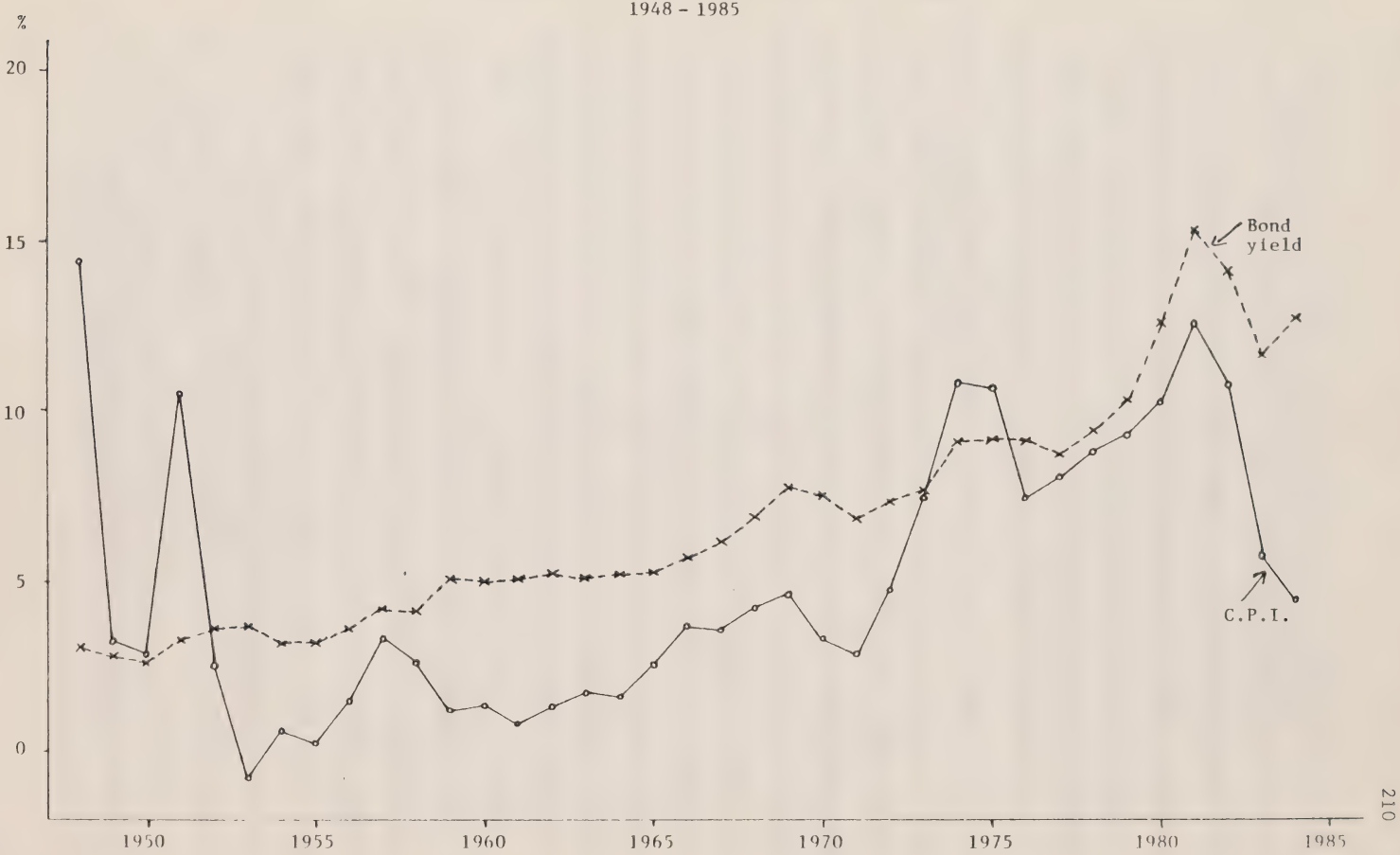
(2) Inflation currently very high with prospective inflation also high but with substantial uncertainty as to the possible future levels. This situation prevailed in mid 1981.

(3) Inflation currently relatively low but with substantial uncertainty as to future levels. This situation prevails currently.

The major differences among the three environments are for the consensus level of prospective inflation and for the compensation required for accepting uncertainty as to future price levels. The annual compensation ranges from two percent to 12 percent for prospective inflation and from zero percent to 3 1/2 percent for uncertainty as to its level. On the presumption that large corporations as a group are eventually able to pass on inflationary increases in their costs through their own prices, the compensation for accepting price level uncertainty is much smaller for equities than for bonds. Accordingly, the spread between the total required rate of return for equities and for bonds is smallest when uncertainty as to future price levels is greatest. In the illustration, the equity and bond required rates were as low as 9 1/2 percent and four percent respectively in the mid 1950's and as high as 21 1/2 percent and 18 percent respectively in mid 1981. Their current values are 15 percent and 11 percent respectively.

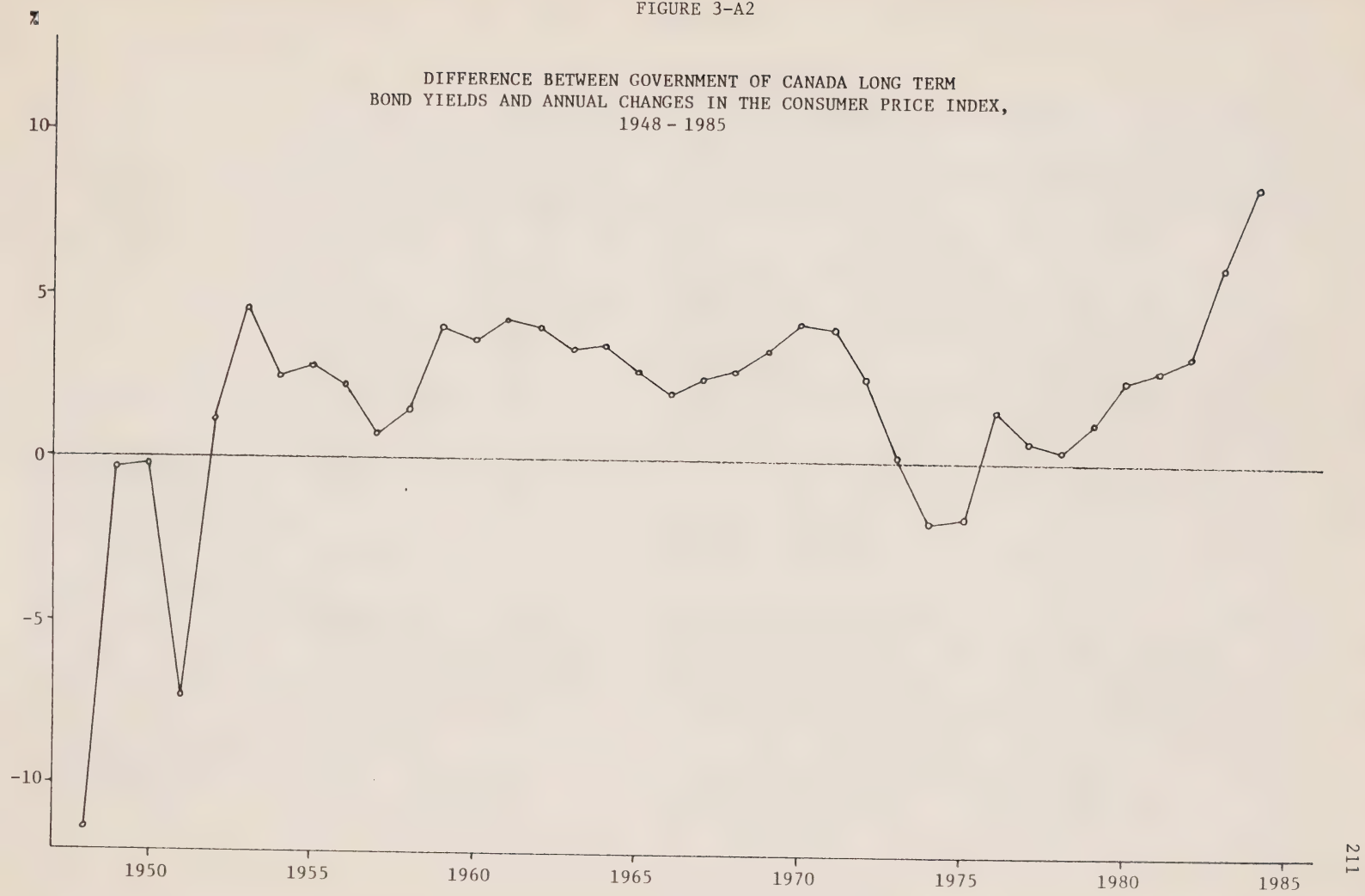
The larger premium required by bond investors to compensate for uncertainty as to future price levels stems from the fact that the income stream to which they are entitled is contractually fixed. To the extent that Ontario's rent control provisions have constrained the ability of landlords to increase their returns in the face of higher rates of inflation, the risks of their equity investments, and hence the rates of return required to attract investors of this type, have been increased in the same fashion as those of investors in long term fixed income securities.

GOVERNMENT OF CANADA LONG TERM BOND YIELDS
AND ANNUAL CHANGES IN THE CONSUMER PRICE INDEX,
1948 - 1985



Source data: Schedule 3-A1

FIGURE 3-A2



Source data: Schedule 3-A1

TABLE 3-A1

REALIZED RATES OF RETURN, SELECTED FINANCIAL INVESTMENTS, UNITED STATES AND CANADA

	STUDY DETAILS		
	Ibbotson and Sinquefield	Federal Task Force on Retirement Income Issues	Hatch and White
Data	United States data on achieved rates of return for (1) the securities listed on the New York Stock Exchange (treated as a portfolio) and (2) U.S. Treasury long term bonds and bills	Canadian data on achieved rates of return for (1) the TSE 300 Index, 1956-1978 and for the Statistics Canada Investors Composite Index of common stock prices for 1915-1955 and (2) Federal Government long term bonds and bills	Canadian data on achieved rates of return for (1) a value weighted portfolio of 763 Canadian stocks and (2) Federal government long term bonds and bills
Period	1926-1981	For stocks: 1915-1978 For bonds : 1920-1978 For bills : 1934-1978	1950-1983
Findings	Compounded annual rate of return: Common stocks : 9.1% U.S. Treasury long term bonds: 3.0% U.S. 90 day Treasury bills : 3.0% Inflation : 3.0%	Compounded annual rate of return: Common stocks: 1915-1978: 8.12% 1952-1978: 8.63% Long term bonds: 1920-1978: 4.23% 1952-1978: 3.70% Treasury bills: 1934-1978: 3.04% 1952-1978: 4.62%	Compounded annual rate of return: Common stocks : 11.46% Long term bonds: 4.14% Treasury bills : 5.47% Inflation : 4.76%
Source document	Roger G. Ibbotson and Rex A. Sinquefield, Stocks, Bonds, Bills And Inflation: The Past And The Future, (Charlottesville, Va., The Financial Analysts Research Foundation, 1982), p. 15.	Government of Canada, The Retirement Income System in Canada: Problems and Alternative Policies for Reform, Vol. II. (Ottawa: Canadian Government Publishing Centre, 1979), Appendix 10.	James E. Hatch and Robert W. White, Canadian Stocks, Bonds, Bills, And Inflation: 1950-1983. (Charlottesville, Va., The Financial Analysts Research Foundation, 1985), pages 8 and 49.

TABLE 3-A2

ILLUSTRATIVE VALUES OF COMPONENTS OF THE INVESTORS' REQUIRED RATE OF RETURN, LONG TERM INVESTMENTS, 1950-1985

Price level environment	Components of required rate of return					Total required rate of return	
	Investment type	Real risk free rate under conditions of no uncertainty as to future price levels	Compensation for the consensus level of prospective inflation over the term of the investment	Compensation for accepting uncertainty as to future price levels	Compensation for risks borne by equity investors in large corporations with minimal inflation risk	Bond	Equity
		(percent)					
Currently low and prospectively low and stable rates of change (e.g., mid 1950's)	Bond	1 3/4	2	1/4	n.a.	4	
	Equity	1 3/4	2	0	5 3/4		9 1/2
Currently high and prospectively continuing at high but uncertain rates of change (e.g., mid 1981)	Bond	2 1/2	12	3 1/2	n.a.	18	
	Equity	2 1/2	12	1	6		21 1/2
Currently relatively low but substantial uncertainty as to future levels (e.g., mid 1985)	Bond	3 1/2	5 1/2	2		11	
	Equity	3 1/2	5 1/2	1/2	5 1/2		15

SCHEDULE 3-A1

DATA USED IN FIGURE 3-A1

Year	Consumer Price Index 1949=100	1961=100	1971=100	1981=100	% change in Consumer Price Index %	Government of Canada long-term bond yields [a] %
1947	84.8					
1948	97.0				14.4	3.02
1949	100.0				3.1	2.92
1950	102.9				2.9	2.79
1951	113.7				10.5	3.31
1952	116.5				2.5	3.60
1953	115.5	89.4			-0.9	3.68
1954	116.2	89.9			0.6	3.11
1955	116.4	90.1			0.2	3.11
1956	118.1	91.4			1.5	3.66
1957	121.9	94.3			3.2	4.15
1958	125.1	96.8			2.6	4.10
1959	126.5	97.9			1.1	5.06
1960	128.0	99.1			1.2	4.98
1961 [b]	129.2	100.0			0.9	5.06
1962	130.7	101.2			1.2	5.21
1963	133.0	103.0			1.8	5.06
1964	135.4	104.8			1.7	5.17
1965	138.7	107.4			2.5	5.26
1966		111.4			3.7	5.73
1967		115.4			3.6	6.09
1968		120.1			4.1	6.94
1969		125.5	94.1		4.5	7.82
1970		129.7	97.2		3.3	7.50
1971		133.4	100.0		2.9	6.90
1972			104.8		4.8	7.32
1973			112.7		7.5	7.62
1974			125.0		10.9	9.02
1975			138.5		10.8	9.14
1976			148.9	62.9	7.5	9.09
1977			160.8	67.9	8.0	8.73
1978			175.1	73.9	8.9	9.31
1979			191.2	80.7	9.2	10.34
1980			210.6	88.9	10.1	12.60
1981				100.0	12.5	15.36
1982				110.8	10.8	14.07
1983				117.2	5.8	11.76
1984				122.3	4.4	12.79

a/ Bond yields shown are averages of end-of-quarter figures.

b/ In 1961, 1957 weights replaced the 1947-48 weights used for Consumer Price Index, and a system of variable weights for seasonal goods was introduced.

Source: Long-term bond yields:
1948-1970: E.P. Neufeld, The Financial System of Canada (Macmillan of Canada, 1972).

1971-1984: Bank of Canada Reviews, Government of Canada average bond yields, 10 years and over maturity.

Comsumer Price Index:
1947-1965: Bank of Canada Statistical Summary, Supplements.

1966-1984: Bank of Canada Reviews, Annual Consumer Price Index.

APPENDIX 3-B

ILLUSTRATIVE ESTIMATES OF THE INVESTORS' REQUIRED RATE OF RETURN

(i) Introductory Comments

The estimation process involves several steps which combine the Discounted Cash Flow ("DCF") Model and the Capital Asset Pricing ("CAPM")/ Market Models. The models are applied in the context of portfolios; the results should, therefore, have a tighter confidence band associated with them than would be the case if they had been developed from the values for individual securities.

The DCF Model is utilized to obtain estimates of the Investors' Required Rates of Return for a stable, low risk group. A low risk group rather than the real estate group is used because of the much greater stability in the historical dividend payment pattern of the former. This stability results in the low risk group's dividend history providing a better basis for extrapolation of observable data into the future. The CAPM/Market Models are then used to determine the relative rate of return requirements for the stable group and the real estate portfolio.

As documented in Appendix 3-A, investors' required rates of return over the post-World War II period have often changed dramatically, even over very short periods of time. Consequently, the values developed by any methodology may be quite specific to a particular time period and the then prevailing circumstances in financial markets. For this reason, the results developed in the following material should simply be viewed as illustrative of the methodology presented.

(ii) The Development of a Stable, Low-Risk Group of Companies

Corporate population

The population used for this analysis is the set of non-financial Canadian Corporations contained in the Financial Post Corporation Service Computer Data Base. For reasons given at a later stage, not all of these corporations qualified for the risk analysis.

Risk measures

Because both the concept and the measurement of risk are elusive, this study utilizes data on five attributes of each corporation's shares to determine their relative risk level. Three of these attributes involve measures of share price instability; the other two involve measures of per share earnings instability. The measures are described in Schedule 3-B1. The measures of share price instability are intended to measure directly the instability of the value of the investor's stake in the corporation and hence the instability of that portion of the investor's wealth. The two earnings per share instability measures can be viewed as indirect measures of the instability of the investor's wealth; the presumption is that changes in share prices are generated in large part by revisions of investors' expectations concerning future earnings levels.

It would be quite inappropriate to equate share riskiness with share price (or earnings) volatility if investors viewed all share price movements as being transitory aberrations from a long term trend or if the changes were always positive. The latter is clearly not the case and there is no guarantee that an investment which loses value today will regain it tomorrow, or for that matter at any time over the investor's holding period. This being the case, those investments having the greatest price instability are those most likely to exhibit a negative

price change that is not completely offset by a change in the opposite direction during the investor's holding period.

Each of the five measures is viewed as providing investors with some, but not complete, information on the riskiness of each corporation's common shares. The totality of this information is assumed to be captured in a single, composite measure of risk for each share issue. This composite measure is simply the sum of a company's relative values on the five instability measures. To obtain the relative values, the companies are ranked on the basis of their score on each attribute. The company with the lowest value on a particular attribute is ranked number one; the company with the highest value has a rank equal to the number of companies in the analysis. Companies which rank low on all measures will rank low on the composite measure, and vice-versa; companies having mixed rankings or middle rankings are unlikely to locate at either extreme on the composite measure.

Criteria for inclusion in the risk analysis

For a company to be included in the risk analysis at a point in time, earnings per share and share price data had to be available for the periods specified (thirteen years in the case of earnings; five years in the case of share prices). In addition, a minimum level of share trading was required to minimize the possibility that month-end index values and the last trade during a month would be materially mismatched. Finally, a few companies were excluded because their financial histories were unduly disjointed, thereby making time series analyses

(iii) Estimation Procedure for DCF Values for the Lowest Risk Group

The DCF Model results in the Investors' Required Rate of Return on a share or portfolio of shares being equal to the sum of (i) the

current dividend yield and (ii) the expected rate of growth in dividends per share.

Each company's current dividend yield for each year is measured by the "indicated annual dividend" as of the date to which the DCF estimates are applicable divided by the mean of the closing price per share for the three preceding months. The indicated annual dividend is the amount that the Toronto Stock Exchange has estimated will be paid over the subsequent twelve months. The current dividend yield for the group is simply the average yield for the companies comprising the group.

The estimate of the expected rate of growth at a particular point in time in the group's dividends is essentially based on the observed rates of growth of the group's dividends over the preceding five, eight and ten years. For the reasons discussed earlier, the use of the aggregate level of historical dividends results in less "noise" than if the growth rates for the individual companies were computed separately and then averaged.

The aggregation method involves giving each company equal weight. To ensure that the results are not unduly influenced by the happenstance of relative share prices in a particular year, the aggregation is undertaken four times, each using the mean of the high and low share prices for a particular year as weights. Essentially, the method replicates the situation of an investor who invested the same dollar amount in a given year in each of the sample companies.

(iv) Results

(a) Investors' Required Rate of Return for the Lowest Risk Group

The 32 corporations contained in the lowest risk group are listed in Schedule 3-B2. Twelve of these corporations were heavily engaged in

utility activities and are subject to formal regulation of the rates of return which can be earned on these assets. The growth rate estimates for these corporations involve the implicit anticipation of the rates of return which may be awarded by the various regulatory tibunals. To avoid (the rather remote) possibility of introducing bias into the growth rate estimates, these corporations were excluded from the analyses undertaken of the lowest risk group. One other company was excluded on the basis that its recent cessation of dividend payments made it unrepresentative and thereby inadequate for extrapolation purposes.

The combinations of historical time periods, index weighting, base years and measurement techniques provide 27 estimates of the investors' required rate of return as of early 1985 for the lowest risk group. The 27 growth rate estimates range from 9.0 to 13.4 percent. Adding the indicated dividend yield of 3.2 percent to the growth rate estimates results in a range of 12.2 to 16.6 percent for the investors' required rate of return. The median value and the mean value are 14.2 percent and 14.3 percent respectively. Details of the estimates appear in Tables 3-B1, 3-B2 and 3-B3.

These historical data suggest that the investors' required rate of return as of early 1985 was within a range of 14 - 15 percent. However, other data (discussed below) indicate that this range, which is based on the experience over the last ten years, overstates the rate of return required as of early 1985 to invest in the lowest risk group. The additional data were (i) growth rates in real terms, (ii) the prospective levels of corporate earnings implied by the historical growth rates and (iii) the trend in historical growth rates.

The future dividend growth rates in real terms implicit in the historically based nominal growth rates of 10 3/4 - 11 3/4 percent represent a substantial increase relative to the real growth rates achieved historically. Specifically, over the ten year period used in the growth computations, inflation -- as measured by the Consumer Price Index -- averaged approximately 9 percent. This average exceeds, by a substantial margin, the generally held view as to the rate of inflation for 1985 (on the order of 4 - 4 1/2 percent) and the higher end of estimates for the two or three years thereafter (5 1/2 - 6 percent). The estimated nominal growth rate of 10 3/4 - 11 3/4 percent would therefore, provide a real growth rate on the order of 6 - 7 1/2 percent in 1985 and 5 - 6 percent thereafter. Historically, lower real growth rates have been achieved. As is shown in Table 3-B4, the 27 achieved real growth counterparts of the nominal growth rates discussed earlier have ranged from 1.2 percent to 3.9 percent.

The prospective levels of corporate earnings implied by the historical dividend growth rate of 10 3/4 - 11 3/4 percent would be extremely hard to achieve. Taking the rate of return on common book equity as a measure of corporate earning power and the more recent historical dividend payout ratios as indicative of future payout ratios (Table 3-B5), book rates of return on the order of 18 percent would be required to achieve the upper end of the range. This level would require a substantial increase in corporate profit rates. Any increase is unlikely, given the prospects for inflation levels.

The trend in historical growth rates also suggests that the average of the 27 growth rates overstates future growth prospects. Both the dividend index values (Table 3-B6) and the dividend growth rates

computed for the past ten, eight and five years indicate that achieved growth has fallen over the latter part of the 10 year period. With the relatively low rates of inflation generally predicted for the foreseeable future, investors could reasonably expect nominal dollar profit levels to grow at rates below those which prevailed on average over the ten year historical period used in the analysis. Lower rates of profit growth would also imply, all other things being equal, lower dividend growth rates. This analysis indicates that the greatest emphasis should be placed on the investor return estimates based on the five year growth rates. These estimates, ranging from 12.2 to 13.7 percent, average 13 percent.

The additional analyses indicate that the historical estimates for the lowest risk group overstate investors' requirements as of early 1985 by approximately one percentage point. Adjusting the historical estimates by this amount gives a range of 13 - 14 percent for the investor's required rate of return as of early 1985 for the lowest risk group.

(b) Investors' Required Rate of Return for the Real Estate Group

Estimating the rate of return required by investors to invest in the common shares of publicly traded real estate corporations involves three steps:

(1) Determining the relative riskiness of the lowest risk group and the real estate group;

(2) Determining the risk premium required by investors in the lowest risk group;

(3) Estimating the risk premium required by investors in the real estate group from the values determined in steps 1 and 2.

For this analysis, the real estate group was comprised of corporations listed by the Financial Post Corporation Service in the following industry classifications: (1) Developers and Contractors ("Property Developers") and (2) Property Management and Investment Companies ("Property Managers"). Corporations listed in these groups were excluded from the analysis if all required data items were not readily available. The ten corporations utilized in the analysis are listed in Schedule 3-B3.

The riskiness of the lowest risk and the real estate groups was determined using the Capital Asset Pricing Model. For the most recent five year period (1980-1984) the average systematic risk ("beta") values of the lowest risk group and the real estate group were 0.5 and 1.2 respectively (see Table 3-B7). For the Toronto Stock Exchange property development sub-index and the property manager sub-index, the values were 1.3 and 1.2 respectively (see Table 3-B8). These values indicate that the risk exposure associated with the lowest risk, stable group of companies was approximately one-half the risk exposure associated with a broadly representative portfolio such as the Toronto Stock Exchange 300 Index. By the same token, the 1.2 to 1.3 values for the various real estate groups indicate that these securities as a group expose investors to approximately 20-30 percent more systematic (or undiversifiable) risk than the TSE 300 Index. Based on these values, which will almost certainly vary from one time period to another, the risk premium (i.e., the return required over and above the return on a risk free security) required by investors to invest in the common shares of a real estate portfolio is approximately 2.5 times (1.25 ÷ 0.5) the premium required by investors to invest in the lowest risk portfolio.

(v) Summary

The anslyses indicated that

(1) As of early 1985 investors required rates of return in the range of 13-14 percent to invest in a portfolio of low risk, stable Canadian companies. This portfolio had a "systematic risk" level of approximately 0.5, implying that investors viewed it as involving a level of risk which was some 50 percent of the risk level of a portfolio consisting of the Toronto Stock Exchange 300 Index.

(2) Publicly-traded Canadian property management and property development companies had, on average, a systematic risk level of approximately 1.25. This implies that they exposed investors to approximately two and one-half times the risk of the portfolio of low risk, stable companies.

This conclusion as to the relative premium is based only on the systematic risk values of the two portfolios. Consideration of only the systematic risk values implies that all other variability in returns from the two groups is unsystematic or so-called "diversifiable" risk for which investors do not require compensation. This type of risk represents a considerably larger fraction of the total variability of returns in the case of the real estate group than in the case of the lowest risk group. If in fact investors do require compensation for some or all diversifiable risk, the relative risk ratio computed above is likely to understate the "true" ratio.

Within the framework of the Capital Asset Pricing Model, the risk premium is defined as the difference between the investors' required

rate of return and the yield available on a "risk free" security. The definition of a risk free asset is not clearcut; the asset qualifying for this sobriquet will vary with the investment horizon of the investor. For present purposes, the three month Government of Canada treasury bill has been used. As of April 4, 1985 (the date of the Investors' Required Rates of Return calculations in Appendix 3-B) the yield on this security was 10.34 percent.

Subtracting the risk free yield from the 13-14 percent estimate of the Investors' Required Rate of Return as of early 1985 for the lowest risk group results in a range of approximately 2.7 - 3.7 percent for the risk premium of the lowest risk group. Applying the relative risk ratio of 2.5 to this value provides a risk premium for the real estate group of 6.8 - 9.2 percent. Adding this premium to the risk free rate of 10.3 percent results in an estimate of 17.1 - 19.5 percent for the Investors' Required Rate of Return as of early 1985.

Estimation of the relative risk premiums could also be undertaken within the framework of the Market Model. However, the application of the Market Model involves, among other matters, consideration of whether or not the intercept term from the regression estimates should be utilized in the computations. For present purposes, the estimates have been restricted to those based on the Capital Asset Pricing Model. As such, they are likely to represent estimates from the lower end of the plausible range and should, therefore, be viewed as conservative indicators of the rates of return required as of early 1985 by investors in the common shares of publicly traded real estate corporations.

As a final note of caution, it is appropriate to reiterate that investors' required rates of return have been extremely volatile over the post-World War II period (as documented in Appendix 3-A). Consequently, the values presented in this Appendix should be viewed as illustrative only of the methodology described.

APPENDIX 3-B

TABLE 3-B1

ESTIMATE OF INVESTORS' REQUIRED RATES OF RETURN FOR
FOR LOWEST RISK GROUP. GROWTH ESTIMATES
BASED ON PERIOD APR. 1, 1979 - MAR. 31, 1985

Method	Current dividend yield (1)	Estimate of expected growth in dividends (2)	Required Rate of Return Sum of [a] (1) and (2) (3)
Compound annual growth rate of equally weighted dividend index			
(a) Using 1979 share prices to determine weights			
(i) compound rate, 1979Q1-1985Q1	3.2	10.5	13.7
(ii) trend line, 1979Q1-1985Q1	3.2	10.2	13.4
(iii) logarithmic trend line, 1979Q1-1985Q1	3.2	10.2	13.4
(b) Using 1981 share prices to determine weights			
(i) compound rate, 1979Q1-1985Q1	3.2	9.8	13.0
(ii) trend line, 1979Q1-1985Q1	3.2	9.6	12.8
(iii) logarithmic trend line, 1979Q1-1985Q1	3.2	9.6	12.8
(c) Using 1984 share prices to determine weights			
(i) compound rate, 1979Q1-1985Q1	3.2	9.3	12.5
(ii) trend line, 1979Q1-1985Q1	3.2	9.0	12.2
(iii) logarithmic trend line, 1979Q1-1985Q1	3.2	9.0	12.2

[a] Columns (1) and (2) may not add to Column (3) due to rounding.

APPENDIX 3-B

TABLE 3-B2

ESTIMATE OF INVESTORS' REQUIRED RATES OF RETURN FOR
FOR THE LOWEST RISK GROUP. GROWTH ESTIMATES
BASED ON PERIOD APR. 1, 1976 - MAR. 31, 1985

Method	Current dividend yield (1)	Estimate of expected growth in dividends (2)	Required Rate of Return: Sum of [a] (1) and (2) (3)
Compound annual growth rate of equally weighted dividend index			
(a) Using 1979 share prices to determine weights			
(i) compound rate, 1976Q1-1985Q1	3.2	12.5	15.7
(ii) trend line, 1976Q1-1985Q1	3.2	13.1	16.3
(iii) logarithmic trend line, 1976Q1-1985Q1	3.2	12.8	16.0
(b) Using 1981 share prices to determine weights			
(i) compound rate, 1976Q1-1985Q1	3.2	11.5	14.6
(ii) trend line, 1976Q1-1985Q1	3.2	11.8	15.0
(iii) logarithmic trend line, 1976Q1-1985Q1	3.2	11.5	14.7
(c) Using 1984 share prices to determine weights			
(i) compound rate, 1976Q1-1985Q1	3.2	11.0	14.1
(ii) trend line, 1976Q1-1985Q1	3.2	11.3	14.5
(iii) logarithmic trend line, 1976Q1-1985Q1	3.2	11.1	14.3

a/ Columns (1) and (2) may not add to Column (3) due to rounding.

APPENDIX 3-B

TABLE 3-B3

ESTIMATE OF INVESTORS' REQUIRED RATES OF RETURN FOR
FOR THE LOWEST RISK GROUP. GROWTH ESTIMATES
BASED ON PERIOD APR. 1, 1974 - MAR. 31, 1985

Method	Current dividend yield (1)	Estimate of expected growth in dividends (2)	Required Rate of Return Sum of [a] (1) and (2) (3)
Compound annual growth rate of equally weighted dividend index			
(a) Using 1979 share prices to determine weights			
(i) compound rate, 1974Q1-1985Q1	3.2	11.3	14.5
(ii) trend line, 1974Q1-1985Q1	3.2	13.4	16.6
(iii) logarithmic trend line, 1974Q1-1985Q1	3.2	12.3	15.5
(b) Using 1981 share prices to determine weights			
(i) compound rate, 1974Q1-1985Q1	3.2	10.5	13.7
(ii) trend line, 1974Q1-1985Q1	3.2	12.0	15.2
(iii) logarithmic trend line, 1974Q1-1985Q1	3.2	11.2	14.4
(c) Using 1984 share prices to determine weights			
(i) compound rate, 1974Q1-1985Q1	3.2	10.0	13.2
(ii) trend line, 1974Q1-1985Q1	3.2	11.5	14.7
(iii) logarithmic trend line, 1974Q1-1985Q1	3.2	10.8	14.0

a/ Columns (1) and (2) may not add to Column (3) due to rounding.

APPENDIX 3-B

TABLE 3-B4

COMPOUND ANNUAL GROWTH RATES OF
CONSTANT DOLLAR DIVIDEND INDEX
FOR THE LOWEST RISK GROUP

Share weighting and growth rate computation method	For the period		
	April 1, 1979-March 31, 1985	April 1, 1976-March 31, 1985	April 1, 1974-March 31, 1985
(a) Using 1979 share prices to determine weights			
(i) compound rate	2.5	3.9	2.8
(ii) trend line	2.3	3.5	3.1
(iii) logarithmic trend line	2.3	3.6	3.1
(b) Using 1981 share prices to determine weights			
(i) compound rate	1.9	2.9	2.1
(ii) trend line	1.7	2.4	2.1
(iii) logarithmic trend line	1.7	2.4	2.1
(c) Using 1984 share prices to determine weights			
(i) compound rate	1.4	2.5	1.6
(ii) trend line	1.2	2.1	1.8
(iii) logarithmic trend line	1.2	2.1	1.8

APPENDIX 3-B

TABLE 3-B5

DIVIDEND PAYOUT RATIOS [a] FOR
THE LOWEST RISK GROUP

COMPANY	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	MEAN
BATON BROADCASTING INC	19.16	29.03	22.96	19.20	22.95	28.17	31.47	32.30	26.88	26.49	28.81	26.13
CANADA PACKERS INC [b]	32.47	24.51	27.23	31.46	28.02	29.81	35.40	31.94	45.85	40.95	51.11	34.43
CANADIAN CORPORATE MGMT	24.94	21.70	25.59	28.09	29.13	25.30	34.48	32.92	44.64	26.39	40.45	30.33
CANADIAN TIRE CORP	15.38	16.67	18.11	20.40	22.09	19.22	22.48	19.26	21.94	31.25	57.14	23.99
CHUM LTD	36.92	27.91	21.24	26.37	31.87	34.52	26.85	23.18	18.42	17.95	15.09	25.48
GRAFTON GROUP LTD [b]	18.61	13.30	15.17	17.49	15.38	14.94	15.75	26.73	38.62	21.21	19.68	19.72
GREYHOUND LINES OF CDA	47.13	39.41	41.91	41.40	40.89	37.20	34.63	38.02	47.24	48.00	53.33	42.65
IMASCO LTD [b]	41.27	34.76	37.71	32.58	29.08	30.26	28.10	25.18	23.05	24.69	28.67	30.49
LABATT, JOHN [b]	46.89	45.98	44.49	39.45	64.67	40.86	37.46	33.72	29.28	37.15	35.66	41.42
MACLEAN HUNTER	45.80	40.16	32.74	23.74	30.15	31.50	31.32	30.41	45.58	33.01	27.01	33.77
MOFFAT COMMUNICATIONS	15.38	16.00	16.56	20.54	24.96	28.24	28.04	31.54	34.71	38.18	36.84	26.45
MOLSON COMPANIES [b]	55.94	46.51	43.79	39.47	33.00	34.52	50.70	38.40	33.33	43.89	42.11	41.97
MOORE CORP	36.92	48.39	54.55	43.17	43.14	38.71	41.52	43.69	55.10	56.66	46.51	46.21
REITMAN'S (CANADA) LTD [b]	26.79	17.51	19.01	19.91	22.69	34.21	27.67	35.80	33.58	32.00	33.55	27.52
SCOTT PAPER LTD	27.25	32.43	26.91	28.45	27.77	25.49	28.52	28.96	29.24	26.74	28.67	28.22
SCOTT'S HOSPITALITY [b]	32.88	28.24	25.41	26.70	30.10	22.22	17.58	19.79	31.17	23.21	24.00	25.57
STANDARD BROADCASTING	85.91	92.42	70.13	64.98	50.81	48.44	36.23	43.86	48.54	50.51	119.05	64.63
TELE-METROPOLE INC	3.16	6.61	6.10	12.50	11.11	25.93	28.10	27.47	34.74	32.86	41.27	20.90
THOMSON NEWSPAPERS	40.96	40.17	37.64	34.78	32.92	40.46	40.39	38.78	43.53	39.41	37.78	38.80
MEDIAN	32.88	29.03	26.91	28.09	29.13	30.26	31.32	31.94	34.71	32.86	36.84	30.33

Notes:

a/ Dividend payout ratios were calculated based on fiscal year end earnings per share and the dividends declared in the corresponding period. Fiscal years ending between January 1 and June 30 are shown under the preceding year; for example, if a company has fiscal year end April 1, 1984, the payout ratio for the period April 2, 1983 - April 1, 1984 is shown under the 1983 heading.

b/ 1984 earnings per share not available; estimates from the Investor's Digest of Canada, February 26, 1985 were utilized in the computations.

APPENDIX 3-B

TABLE 3-B6

ANNUAL VALUES OF DIVIDEND INDEX
FOR THE LOWEST RISK GROUP

12 months ending March 31	Using 1979 share prices as weights	Using 1981 share prices as weights	Using 1984 share prices as weights
1975	2.332	1.923	1.271
1976	2.511	2.080	1.371
1977	2.657	2.194	1.440
1978	2.960	2.448	1.608
1979	3.500	2.848	1.859
1980	4.136	3.265	2.122
1981	4.673	3.645	2.379
1982	5.311	4.087	2.663
1983	5.806	4.453	2.887
1984	6.149	4.709	3.031
1985	6.811	5.223	3.309

APPENDIX 3-B

TABLE 3-B7

ESTIMATED AVERAGE RISK VALUES FOR TSE LISTED
PROPERTY MANAGERS AND DEVELOPERS

Estimate using data for the period (inclusive)	Number of companies	Systematic risk ("beta")	Total risk (standard deviation)		
			For property companies	For TSE 300 Index	Ratio of (2) to (3)
		(1)	(2)	(3)	
1969-1973	8	1.27	11.98	4.53	2.64
1970-1974	8	1.23	12.14	5.02	2.42
1971-1975	10	1.16	11.49	5.10	2.25
1972-1976	10	1.10	11.14	5.22	2.13
1973-1977	10	1.06	10.45	5.04	2.07
1974-1978	10	1.10	10.47	4.92	2.13
1975-1979	9	1.11	10.42	4.51	2.31
1976-1980	8	1.00	10.86	5.22	2.08
1977-1981	8	1.16	11.78	5.60	2.10
1978-1982	8	1.26	14.15	6.40	2.21
1979-1983	8	1.22	14.27	6.37	2.24
1980-1984	9	1.17	13.90	6.14	2.26
1981-1985 (Apr.)	9	1.29	13.88	5.46	2.54

APPENDIX 3-B

TABLE 3-B8

ESTIMATED AVERAGE RISK VALUES FOR THE TORONTO STOCK EXCHANGE REAL ESTATE SUB-INDICES

Estimate using data for the period (inclusive)	Combined Property Developers and Managers TSE Sub-Indices		Property Developers TSE Sub-Index		Property Managers TSE Sub-Index	
	Systematic risk ("beta")	Total risk (standard deviation)	Systematic risk ("beta")	Total risk (standard deviation)	Systematic risk ("beta")	Total risk (standard deviation)
1969-1973	1.33	8.65	1.63	9.66	1.03	7.63
1970-1974	1.32	8.83	1.51	9.85	1.12	7.82
1971-1975	1.28	8.54	1.40	9.29	1.15	7.80
1972-1976	1.16	8.10	1.28	8.58	1.05	7.63
1973-1977	1.10	7.67	1.19	7.98	1.02	7.36
1974-1978	1.13	7.49	1.12	7.01	1.14	7.98
1975-1979	1.25	8.10	1.18	7.17	1.31	9.03
1976-1980	1.08	8.70	1.03	7.96	1.14	9.43
1977-1981	1.25	10.16	1.28	10.01	1.22	10.31
1978-1982	1.40	12.35	1.41	12.63	1.39	12.07
1979-1983	1.39	12.35	1.41	12.75	1.37	11.94
1980-1984	1.24	11.15	1.30	11.98	1.18	10.31
1981-1985 (April)	1.36	10.80	1.46	11.64	1.26	9.96

APPENDIX 3-B

SCHEDULE 3-B1

DEFINITION OF FIVE RISK MEASURES

A. Measures relating to instability of earnings per share

(1) The maximum percentage shortfall in annual earnings per share below the trend value fitted to annual data for 13 years ending 1983.

(2) The mean absolute deviation, (expressed in percentage terms), of annual earnings per share about a three-year moving average.

B. Measures relating to instability of share price

(3) The maximum drop (expressed in percentage terms), over a 12 month period in share price. Month-end prices for the five year period December, 1979 - December, 1984 inclusive were used.

(4) The systematic component of the variation in the price appreciation component of investor yields as measured by the "Beta factor" utilizing month-end share prices for the five year period December, 1979 - December, 1984 inclusive.

(5) The total variability in investor yields as measured by the standard deviation of the price appreciation component utilizing month-end share prices for the five year period December, 1979 - December, 1984 inclusive.

APPENDIX 3-B

SCHEDULE 3-B2

COMPANIES CONTAINED IN
FIRST (LOWEST RISK) SEPTILE

Companies	Companies contained in non-utility sample
Alberta Natural Gas	
Baton Broadcasting	x
Bell Canada Enterprises	
British Columbia Telephone	
Canada Packers	x
Canadian Corporate Management	x
Canadian Tire Corp.	x
Canadian Utilities	
Chum Ltd.	x
Grafton Group	x
Great Pacific Industries [a/]	
Greyhound Lines Canada	x
Imasco	x
Inland Natural Gas	
Interprovincial Pipe Line	
Labatt, John	x
Maclean Hunter	x
Maritime Tel & Tel	
Moffat Communications	x
Molson Companies	x
Moore Corp.	x
New Brunswick Telephone	
Newfoundland Light & Power	
Newfoundland Telephone	
Reitman's (Canada)	x
Scott Paper	x
Scott's Hospitality	x
Standard Broadcasting	x
Tele-Metropole	x
Thomson Newspapers	x
TransAlta Utilities	
Union Enterprises	
Westcoast Transmission	

a/ Great Pacific Industries ranked in the first septile. However, it was not included in the 20 non-utilities due to having suspended the payment of dividends in late 1982. All companies ranking after GPI were moved up by one rank.

APPENDIX 3-B

SCHEDULE 3-B3

THE REAL ESTATE GROUP - COMPOSITION
AND DATA AVAILABILITY

Company	Financial data available	Common shares trading
Property Developers		
Bramalea Ltd.	1966 - 1983	May 1963 - April 1985
Carma Ltd.	1971 - 1982	July 1972 - April 1985
Costain Ltd.	1967 - 1983	April 1969 - April 1985
Daon Development	1971 - 1984	Feb. 1970 - April 1985
Melcor Development	1970 - 1983	June 1972 - April 1985
Nu-West Group	1968 - 1982	Sept. 1969 - April 1985
Y & R Properties	1968 - 1977	July 1969 - Sept. 1978
Property Managers		
Cadillac Fairview	1974 - 1983	April 1969 - April 1985
Campeau Corporation	1974 - 1983	April 1969 - Dec. 1977 and June 1981 - April 1985
Trizec Corporation	1967 - 1983	June 1968 - April 1985

APPENDIX 3-C

CAPITAL STRUCTURE TABLES
FOR CORPORATIONS IN THE TORONTO STOCK EXCHANGE
PROPERTY MANAGERS AND DEVELOPERS
INDUSTRY GROUP

APPENDIX 3-C

TABLE 3-C1

AVERAGE CAPITAL STRUCTURE[a/] FOR PROPERTY MANAGERS AND DEVELOPERS
BASED ON BOOK EQUITY

YEAR	BOOK EQUITY %	LONG TERM DEBT %	PREFERRED STOCK %	DEFERRED TAXES %	MINORITY INTEREST %	AVERAGE INVESTED CAPITAL ($ MILLIONS)
1966	35.3	64.6	0.0	0.0	0.1	29.1
1967	34.9	62.7	0.0	2.4	0.1	66.2
1968	35.9	60.2	0.0	3.8	0.0	48.4
1969	39.7	55.7	0.0	4.3	0.3	66.7
1970	40.4	54.6	0.0	4.7	0.2	60.0
1971	32.3	59.6	0.0	8.0	0.1	80.3
1972	29.2	63.3	0.0	7.4	0.1	99.1
1973	24.5	67.8	0.0	7.7	0.0	117.3
1974	21.8	70.0	0.3	7.9	0.0	225.2
1975	21.7	69.1	0.3	8.8	0.0	262.4
1976	21.8	69.1	0.3	8.8	0.0	305.5
1977	20.4	69.4	1.3	8.9	0.0	366.8
1978	18.5	70.1	2.7	8.8	0.0	493.5
1979	17.2	71.1	2.3	9.4	0.0	622.3
1980	16.7	71.4	2.7	9.0	0.2	818.2
1981	14.6	72.9	4.2	8.0	0.2	1,082.9
1982	7.7	79.0	5.5	7.1	0.6	1,088.3
1983	-1.4	86.0	7.6	7.1	0.6	1,091.0
1984	11.1	81.5	4.9	2.4	0.0	2,140.5
Mean 1980-84	9.7	78.2	5.0	6.7	0.3	

a/ Components may not add to 100% due to rounding.

APPENDIX 3-C

TABLE 3-C2

AVERAGE CAPITAL STRUCTURE[a/] FOR PROPERTY MANAGERS,
BASED ON BOOK EQUITY

YEAR	BOOK EQUITY %	LONG TERM DEBT %	PREFERRED STOCK %	DEFERRED TAXES %	MINORITY INTEREST %	AVERAGE INVESTED CAPITAL ($ MILLIONS)
1967	5.0	94.9	0.0	0.0	0.1	163.5
1968	15.8	84.2	0.0	0.0	0.0	164.9
1969	12.4	87.6	0.0	0.0	0.0	232.7
1970	15.8	84.1	0.0	0.0	0.1	245.6
1971	20.8	77.4	0.0	1.7	0.2	464.8
1972	19.0	78.8	0.0	2.1	0.1	534.0
1973	19.6	77.3	0.0	3.0	0.1	541.9
1974	14.5	78.2	1.0	6.2	0.1	586.9
1975	15.5	75.9	1.0	7.5	0.1	634.2
1976	14.6	77.1	0.8	7.4	0.1	699.4
1977	12.9	78.3	1.8	6.9	0.1	788.7
1978	11.1	78.7	3.4	6.8	0.0	933.4
1979	10.9	78.2	3.2	7.6	0.0	1,026.1
1980	11.8	77.9	3.1	7.2	0.0	1,272.8
1981	10.0	79.4	3.4	6.9	0.3	1,614.0
1982	10.4	78.1	3.1	8.1	0.3	1,669.7
1983	11.8	78.1	2.9	7.0	0.3	1,838.7
1984	10.4	78.3	8.4	3.0	0.0	3,090.6
Mean 1980-84	10.9	78.4	4.2	6.4	0.2	

z/ Components may not add to 100% due to rounding.

APPENDIX 3-C

TABLE 3-C3

AVERAGE CAPITAL STRUCTURE FOR PROPERTY DEVELOPERS,
BASED ON BOOK EQUITY

YEAR	BOOK EQUITY %	LONG TERM DEBT %	PREFERRED STOCK %	DEFERRED TAXES %	MINORITY INTEREST %	AVERAGE INVESTED CAPITAL ($ MILLIONS)
1966	35.3	64.6	0.0	0.0	0.1	29.1
1967	49.8	46.6	0.0	3.6	0.1	17.7
1968	41.0	54.2	0.0	4.8	0.0	19.3
1969	46.6	47.7	0.0	5.3	0.4	25.2
1970	45.3	48.7	0.0	5.7	0.3	22.9
1971	33.9	57.0	0.0	8.9	0.1	25.4
1972	30.7	61.1	0.0	8.1	0.1	36.9
1973	25.2	66.4	0.0	8.4	0.0	56.6
1974	24.9	66.5	0.0	8.7	0.0	70.2
1975	24.4	66.2	0.0	9.4	0.0	103.0
1976	24.8	65.7	0.1	9.4	0.0	136.7
1977	23.6	65.7	1.1	9.7	0.0	186.0
1978	22.1	65.7	2.3	9.8	0.0	273.6
1979	20.3	67.5	1.8	10.3	0.1	420.5
1980	19.1	68.2	2.5	9.9	0.2	590.9
1981	16.9	69.7	4.6	8.6	0.2	817.3
1982	6.4	79.5	6.7	6.6	0.8	797.6
1983	-7.9	90.0	10.0	7.2	0.8	717.2
1984	11.9	84.8	1.5	1.8	0.0	1,190.3
Mean 1980-84	9.3	78.4	5.1	6.8	0.4	

a/ Components may not add to 100% due to rounding.

APPENDIX 3-C

TABLE 3-C4

AVERAGE CAPITAL STRUCTURE [a/] FOR PROPERTY MANAGERS AND DEVELOPERS, BASED ON MARKET EQUITY

YEAR	MARKET EQUITY %	LONG TERM DEBT %	PREFERRED STOCK %	DEFERRED TAXES %	MINORITY INTEREST %	AVERAGE INVESTED CAPITAL ($ MILLIONS)
1966	25.3	74.6	0.0	0.0	0.1	25.2
1967	11.4	83.0	0.0	5.5	0.1	61.8
1968	19.7	73.6	0.0	6.7	0.0	57.4
1969	60.1	37.3	0.0	2.5	0.1	68.9
1970	49.4	46.5	0.0	3.9	0.2	52.5
1971	30.1	60.3	0.0	9.5	0.1	81.5
1972	35.5	57.8	0.0	6.6	0.1	106.1
1973	28.9	63.8	0.0	7.3	0.0	126.4
1974	24.9	67.2	0.3	7.7	0.0	255.1
1975	19.5	71.0	0.3	9.2	0.0	273.2
1976	19.0	71.5	0.3	9.2	0.0	310.6
1977	19.2	70.4	1.3	9.0	0.0	368.6
1978	22.3	66.8	2.5	8.3	0.0	515.9
1979	24.9	64.5	2.0	8.5	0.0	703.2
1980	25.7	63.7	2.3	8.1	0.1	952.4
1981	28.2	61.3	3.4	6.9	0.2	1,343.1
1982	17.1	71.5	4.3	6.5	0.6	1,239.7
1983	17.8	70.6	4.8	6.2	0.5	1,320.6
1984	18.1	75.7	4.1	2.1	0.0	2,544.6
Mean 1980-84	21.4	68.6	3.8	6.0	0.3	

a/ Components may not add to 100% due to rounding.

APPENDIX 3-C

TABLE 3-C5

AVERAGE CAPITAL STRUCTURE[a/] FOR PROPERTY MANAGERS,
BASED ON MARKET EQUITY

YEAR	MARKET EQUITY %	LONG TERM DEBT %	PREFERRED STOCK %	DEFERRED TAXES %	MINORITY INTEREST %	AVERAGE INVESTED CAPITAL ($ MILLIONS)
1967	0.0	99.9	0.0	0.0	0.1	155.2
1968	28.1	71.9	0.0	0.0	0.0	193.1
1969	22.0	78.0	0.0	0.0	0.0	261.4
1970	14.7	85.2	0.0	0.0	0.1	242.5
1971	21.1	77.0	0.0	1.7	0.2	467.0
1972	23.4	74.5	0.0	2.0	0.1	564.6
1973	26.2	71.0	0.0	2.8	0.1	590.1
1974	23.8	69.6	0.9	5.5	0.1	684.4
1975	18.7	73.0	1.0	7.2	0.1	680.0
1976	16.1	75.6	0.9	7.3	0.1	730.1
1977	13.7	77.6	1.8	6.8	0.1	799.3
1978	13.4	76.6	3.4	6.6	0.0	963.7
1979	16.4	73.6	3.0	7.0	0.0	1,148.0
1980	18.5	72.0	2.8	6.7	0.0	1,463.4
1981	29.4	62.2	2.7	5.5	0.2	2,117.6
1982	21.1	68.7	2.8	7.2	0.3	1,930.1
1983	26.4	65.1	2.3	5.9	0.3	2,247.6
1984	30.3	60.9	6.5	2.3	0.0	3,974.3
Mean 1980-84	25.1	65.8	3.4	5.5	0.2	

a/ Components may not add to 100% due to rounding

APPENDIX 3-C

TABLE 3-C6

AVERAGE CAPITAL STRUCTURE FOR PROPERTY DEVELOPERS,
BASED ON MARKET EQUITY

YEAR	MARKET EQUITY %	LONG TERM DEBT %	PREFERRED STOCK %	DEFERRED TAXES %	MINORITY INTEREST %	AVERAGE INVESTED CAPITAL ($ MILLIONS)
1966	25.3	74.6	0.0	0.0	0.1	25.2
1967	17.1	74.5	0.0	8.3	0.1	15.1
1968	17.5	74.0	0.0	8.4	0.0	23.5
1969	67.8	29.1	0.0	3.0	0.2	30.4
1970	55.2	40.1	0.0	4.6	0.2	20.9
1971	31.4	57.9	0.0	10.6	0.1	26.4
1972	37.3	55.4	0.0	7.2	0.1	40.6
1973	29.3	62.8	0.0	7.9	0.0	60.2
1974	25.3	66.1	0.0	8.6	0.0	71.1
1975	19.9	70.1	0.0	10.0	0.0	98.8
1976	20.2	69.8	0.1	10.0	0.0	130.8
1977	21.6	67.3	1.1	10.0	0.0	184.1
1978	26.7	61.9	2.1	9.2	0.0	292.1
1979	29.2	60.0	1.6	9.2	0.0	480.9
1980	29.3	59.6	2.0	8.8	0.2	696.9
1981	27.6	60.9	3.8	7.5	0.2	955.9
1982	15.2	72.8	5.0	6.2	0.8	894.5
1983	13.5	73.4	6.1	6.4	0.7	857.1
1984	5.9	90.5	1.6	1.9	0.0	1,114.9
Mean 1980-84	18.3	71.4	3.7	6.2	0.4	

a/ Components may not add to 100% due to rounding.

CHAPTER 4

DESIGNING AND IMPLEMENTING A VIABLE REGULATORY MODEL

1. Introduction

We approach the problem of designing and implementing a regulatory structure for this industry in a two-stage process. Initially, we consider what would, in our opinion, constitute an ideal system in the absence of the regulatory and compliance costs that accompany any system. We recognize that the resources devoted to the regulatory process must be much more restricted in the case of a $4,000 per year rental apartment than they are in the case of a $40,000,000 per year electrical system. We prefer to make the necessary modifications to an otherwise appropriate system later on rather than to attempt to create a system which complies with the regulatory resource constraints by dealing with all other issues on an *ad hoc* basis.

Our review of regulatory methods and their applicability to rental housing suggests that some form of cost-of-service or rate base-rate of return regulation would be conceptually preferable to the available alternatives, because it is the only method flexible enough to accommodate the very wide range of investment per unit and of financing costs observed in practise. It provides an accounting framework within which it is possible to separate issues of fairness from issues of efficiency and capital attraction. If capital attraction requirements are not met, the regulatory process will eventually fail for lack of supply. The closest substitute, regulation using a standard markup on operating expenses is, in our view, likely to fail because operating expenses do not constitute anything like a uniform percentage of measured cost of service.

It cannot be emphasized too strongly that, in choosing a regulatory model from among the rate base-rate of return family, we are not free to regard the alternative methods of treating rate base, rate of return, etc., discussed in Chapter 2 as an à la carte menu, to be selected in any combination our fancy dictates. Certain combinations will result in de facto expropriation of the present landlord's equity, and perhaps in his de jure expropriation through foreclosure proceedings. Others may fall short of expropriation but may nonetheless be sufficiently devastating to deprive the industry of the capital it will need to maintain, modernize, and enlarge the housing stock. It would be much better, if we continue the menu analogy, to regard the choice of rate base valuation method as the selection of a main course on a table d'hote menu, offering very restricted choices of complementary components.

2. Choice of Rate Base

Our review suggests that the choice from among the available rate base valuation methods should be based on regulatory expediency and industry characteristics. All are capable of providing adequate inflation protection to the equity investor, a necessary feature to attract capital and one which is conspicuously lacking under present regulatory arrangements. None, however, provide the potential for windfall gains during inflation that characterized the unregulated market; as a consequence of this loss of upside potential, somewhat higher current returns will have to be provided to attract capital from alternative uses. The available alternatives should provide for continuing marketability, albeit at prices reflecting rate base values, which would, in most instances, imply higher values than would prevail under a continuation

of the present regulatory system, which has confiscatory aspects. By holding resale values to rate base levels, some minor damping effect on the value of alternative (i.e., owner-occupied) accommodation might be expected. To the extent that land values escalate, cost-of-service regulation in any form, or any other method of regulation which does not recognize current land values, may be expected to shorten the economic lives of the existing rental housing stock, as it will pay to demolish when the (independently determined) market value of the land exceeds the value of the implied earnings on the residual rate base. This problem might be slightly more acute in a regulatory system employing an original cost rate base, but this is by no means clear; residual earnings streams under trended cost or replacement cost bases would be little different if "real" rates of return are employed.

With respect to the existing capital stock, the salient characteristics which dominate the choice of a rate base valuation method are the large number of participants and the even larger number of separate units being rented, the widely disparate dates at which existing units will be acquired by their present owners, and the fact that much of this investment, made prior to 1975, was made in what was believed to be an unregulated industry. Even after 1975, investors may have acquired new properties or made improvements to existing ones in the belief that controls were, as promised at their inception, temporary.

These circumstances, in our view, make the use of historical cost inappropriate if not totally unworkable. The "aboriginal" cost version (original cost to the original owner) is unworkable first of all because it depends on data which may no longer exist, but more importantly because subsequent buyers, or even the original owner, will in many cases

have mortgaged the property for more than this version of original cost while the industry was unregulated. For such owners the ultimate consequence of adopting this valuation method would be default and foreclosure. Moving to original cost to the present owner would take care of this problem for subsequent buyers, though it would still leave an original owner who enlarged his mortgage beyond his initial acquisition cost on the hook. Another, under this version, identical properties, constructed at the same time, would have widely differing values for rate base purposes, depending on their subsequent sales history and its relation to the progress of inflation. This version would create windfall gains for the tenants of buildings which have been held by a single owner for a long time in comparison to those in recently acquired buildings.

For sales subsequent to 1985, we would apply the 1985 value, trended for price level changes subsequent to 1985, and adjusted for any capital improvements made subsequent to that date. Appropriate depreciation would of course be deducted.

It is, we believe, reasonable to require that a regulatory system ensure that comparable units rent for at least roughly comparable amounts, not only on grounds of economic efficiency, but on grounds of fairness. If "equality is equity" is good for tenants, it is also good for landlords. Application of the "historical cost to the present owner" standard would deprive the longtime landlord of much of the asset value he held at the date regulation commenced, while depriving the recent buyer of none.

These problems can be overcome, to a significant extent, by use of a trended historical cost standard, in which acquisition costs, and

costs of capital improvements, are brought up-to-date by using a price index. Such an approach is not without problems, but they are minor in comparison to the problems posed by the use of a pure historical cost standard. There remains the problem of ascertaining the "true" historical cost from a transaction in which the market price may have been obscured by, e.g., a vendor take-back of mortgage at less than the market interest rate, and the problem of distinguishing capital improvements, which should be added to the rate base, from maintenance expenditures, which should not. In the latter case, income tax considerations have encouraged expensing to the maximum extent acceptable to the tax authorities. There was no offsetting incentive to capitalize for regulatory purposes, so that the original accounting treatment is of little help in making the distinction. The problem will have to be resolved arbitrarily as far as past expenditures in these categories are concerned.

The purpose of trending is to promote equal treatment of tenants in comparable buildings and equal treatment of landlords who acquired at different dates. Both purposes require that the system take account of changes in the value of money. The purpose is not to create windfall profits for any or all landlords, but to ensure that a landlord who invested four years' wages in an apartment unit in 1958 receives an income roughly comparable to his neighbour who invested four years' wages in a comparable unit in 1974. The purpose of trending is to correct for inflation, or changes in the value of money, not to reflect changes in land values or in the replacement cost of any particular types of housing. For this purpose, we believe that an index of general purchasing power is more appropriate than an index of replacement cost.

The appropriate index, given these purposes, is the Consumer Price Index (CPI). It is the closest to being widely understood in the community; the alternatives are complex and confusing to the layman. The Housing Cost component of the CPI should not be used, for obvious reasons of circularity. Some of the circularity carries into the total CPI, since the housing component is a significant fraction of the total; but this fraction is not large enough in our view to create a problem. We would use the national CPI and not that for localities within the province.

For practical purposes, given the "temporary" character of regulation for 1975-1985, and the extent to which the value of the currency units has declined between the two dates, it is our view that trended cost rate bases should be defined as original cost expressed in 1985 dollars, subject of course to appropriate depreciation. The appropriate rate of return to use with a trended cost rate base is a "real" rate, purged of its expected inflation component. This is neither observable directly nor computable on any agreed basis; its introduction on a universal basis across the regulatory process would create a degree of arbitrariness as likely to damage capital attraction as to enhance it. In any event, since the largest fraction of net assets is usually financed with mortgages payable in "nominal" dollars and carrying an interest obligation which is fixed at a "nominal" interest rate, use of a current value/real rate combination would create financing difficulties for such properties, where the trended rate base/real cost of funds does not provide a suitable coverage margin over the mortgage value. Because of this problem we would allow embedded nominal cost on those portions of the rate base financed with debt, and a real equity return on the balance. We

have given serious consideration to using an original cost-nominal return framework, but have concluded that this course would create even more mischief than the course we have chosen.

We would allow depreciation on a sinking fund basis over an assummed forty-year life at an interest rate reflecting the real equity rate of return chosen. This would be applied to the depreciable portion of the investment; for practical reasons we would suggest that tables be prepared, reflecting applications of price level adjustments plus depreciation on a standard "typical" ratio of building investment to land investment, on a vintage-of-acquisition basis. We would expect most landlords to use this table, provision needs to be retained to substitute actual ratios in cases where they differ markedly from the typical. An example is given in Appendix 4-1.

3. Administrative Problems

Our review of regulatory practise suggests several features which are almost certain to complicate any attempt to apply cost-of-service regulation, in unmodified form, to an industry with tens of thousands of producing units and thousands of producers. A very basic problem is posed by the inherent complexity of the regulatory process. A contested rate case involving a utility company may involve upwards of two weeks of hearings, and additional time for preparation, review, etc., and impose costs of $250,000 or more on participants, including costs of counsel, expert witnesses, reporters and regulatory personnel. This cost is substantially in excess of the total cost of most of the indivicual housing units under regulation, and is so clearly disproportionate to the benefits to any party involved that its unmodified application cannot seriously be contemplated. It is accordingly imperative that

some modifications be developed which preserve the essential ingredients of the cost-of-service model but avoid its costs. A cost even 1/1000 of the amount referred to above would be seriously excessive, given the need for frequent adjustment.

Some modifications might involve procedures which

(a) deal with large numbers of units in a single proceeding;

(b) modify the procedures to limit issues and simplify the process;

(c) provide an automatic adjustment mechanism which will obviate the need for resort to the formal process in the large majority of cases.

It is necessary, if capital is to be attracted to the industry on a continuing basis and if fairness to all parties is to be maintained, that the basic ingredients of procedural due process be maintained. The minimum which must be maintained, in our view, is that affected individuals have the right to make submissions on their own behalf, have access to the case presented by parties opposed in interest and the right to meet that case and reply to it, and that decisions be made on the record. This need not, in our view, preclude the regulatory agency taking administrative notice of certain facts in the public domain. It does not necessarily require a hearing nor the right to cross-examine. It does, however, require that decisions be made in an administrative context and not by repeated application of the political process; it may require an appeal procedure. This observation is not intended to imply criticism of the political process per se, only to observe that the uncertainty created by repeated political interference may undermine the

sense of stability many investors require before committing their funds to a particular venture.

(d) The Problem of Records

There is a great deal of informal evidence to the effect that many landlords either keep no records or keep records which are inadequate for the purpose of regulation. The essence of cost-of-service regulation is the recording of all of the components of cost in verifiable form and, usually, in a common format as prescribed by a Uniform System of Accounts.

The development of such an accounting system, to be operated in lieu of other forms of record keeping or in parallel with them, is, it is suggested, a sine qua non of a viable regulatory system. Such a system need not, indeed should not, be complex but should provide records of

(a) asset costs;

(b) accumulated depreciation for regulatory purposes;

(c) operating and administrative expenses;

(d) depreciation expense;

(e) interest expense;

(f) income tax expense;

(g) net debt, deferred taxes, and equity of the owner(s)

and should be made up at least annually. We do not believe this record-keeping requirement to be unduly onerous, as most of the required details are also required by the Income Tax Act; the only differences are items (b), (d) and (g). Where a number of properties are under common ownership, grouping should be permitted. It may well be that some landlords

do not keep the records required by the Income Tax Act, if they do not the presumption is that they are evading taxes. This is hardly a reasonable ground on which to plead for exemption from keeping records.

Of those who do keep records, it will only be by accident that existing accounting systems conform to the requirements of a Uniform System of Accounts. In general, the latter should require less detailed breakdowns than would normally be provided in a well-developed system designed for internal use; the required statements could easily be produced from an adequate existing system.

The one item which may pose the greatest difficulty is property cost. The essence of trended original cost regulation in the version we have proposed is cost to the present owner. The figure is required for the determination of C.C.A. for tax purposes and is likely to be available. If it is not, value as determined from land transfer tax records may have to be used. Going back to costs to earlier owners would expose owners acquiring before the inception of regulation to double jeopardy; having paid in excess of original cost to the previous owner, they are effectively required to yield that portion of their purchase cost up to destruction by its exclusion from the rate base. Where an industry moves from unregulated status to regulated, it seems more appropriate to "grandfather" all existing assets at their values as at the time the transition became definitive. Such a valuation-date approach complicates the process but seems to use to provide the fairest bases for transition when nominal original costs may vary widely because of nothing more important than date of acquisition.

It is a legitimate purpose of regulation to protect tenants against real rent increases resulting from construction cost or land value changes

occurring after the inception of regulation. Use of regulation to shield tenants from such increases in the value as took place in an unregulated market before regulation was introduced is a more questionable exercise. If it were to be done at all, equality considerations would suggest that comparable percentage sacrifices be imposed on all landlords. While the ultimate loss borne by all would be equal under such a rule, the immediate impact would be more severe on the recent buyer who has purchased a fully mortgaged property.

The alternative to using trended cost is to use appraisals to arrive at transition date values. While we recognize that many landlords may well have appraisals prepared for capital gains tax purposes, our experience with appraisals and with the assessment process in municipal property taxation, which is perhaps the nearest comparable system, suggests that reliance on accounting records and adjustment using index numbers is at least as reliable and significantly less costly.

A register of properties would be created, recording trended cost values less depreciation as at December 31, 1985, or such later date as the system was instituted and for units constructed after that date or for other capitalized improvements since that date. These values should be accessible to prospective buyers, who would be bound by them for regulatory purposes.

5. Reduction of Complexity Through Reduction in Numbers

One important means of reducing the number of cases requiring separate administrative attention is to consolidate rental units into groups, to be adjudicated together. Some units are naturally grouped by virtue of their inclusion in the same building, and as a minimum,

all units in a given building should be considered jointly. Every encouragement, however, should be given to the creation of larger groupings. These might consist of all the buildings within a given municipality owned by the same owner; indeed consideration should be given to requiring grouping at this level.

We are aware that landlords are highly individualistic, and that groups of them find great difficulty in agreeing on very much of anything. We doubt, however, that the individualism of landlords is any more pronounced than that of truckers. We note that the use of rating groups has provided a convenient administrative device for coping with large numbers of participants in certain regulated industries, notably trucking and insurance. [Cf. also the use of "area rate" proceedings by the F.P.C.] While we are aware that none of the examples in which rating groups have been used are conspicuous regulatory successes, other factors made major contributions to their failures, and we believe their use in regulating rents is worthy of serious consideration.

Grouping should be voluntary, but once joined units should be required to remain within a rating group for a period of 3 to 5 years.

In considering groupings however, it must be recognized that, unlike the services of railroad boxcars, housing units are not fungible and one cannot be substituted for the other. While it may make sense to determine the aggregate increase in rents for a group of dwellings, some control over the allocation of the aggregate increase to individual units may have to be retained. In general, we would expect any departure from equal percentage increases on all units, in an amount determined by the increase in cost-of-service for the group, to require separate justification. The justification required may be fairly trivial, e.g., to

eliminate anomalies in the present rent structure, but should be brought forward for review and approval or disapproval. This is of course, done as between customer classes in existing rate cases. New units will have to attract enough rents to cover a fair return on their cost of construction and must "stand on their own bottom" in this regard.

In addition to reducing numbers via groupings, consideration should also be given to removing certain categories of units from regulation entirely. Single-family detached dwellings and units in semi-detached dwellings where the landlord inhabits the other half are categories which, while numerous, do not contribute a particularly large percentage to the available units in most communities. If exempted, competition from regulated units can be expected to apply sufficient constraint to the rentals available from such units; other categories were deregulation should be considered include other duplexes, triplexes, fourplexes, and units over shops in two-storey structures. Tightness in supply may preclude immediate deregulation of all of these types of unit; some should however, be deregulated at once. As soon as a system providing adequate investment incentives is in place, however, they should be deregulated within a suitable period, say 18 months. It is, in our opinion important that provision for deregulation of such units on a scheduled basis be provided in any new scheme of regulation to be adopted, and that the schedule be adhered to, in light of the potential impacts on the credibility of the regulatory process and on investor confidence.

6. Modification of Procedures to Limit Issues

A major portion, perhaps half and often more, of the time taken by the average contested rate case is concerned with cost-of-capital or rate-of-return issues. While there are often differences in embedded

debt or preferred stock cost from one company to another, partly reflecting differences in credit ratings but mostly reflecting differences in the dates at which the relevant financing was undertaken, the bulk of this testimony relates to common equity costs. There is seldom any dispute over the embedded costs of senior capital, as the basic formulas are usually accepted by both sides and a clerical check on calculations is all that is required.

Cost of common equity are a far different matter although all firms raise such capital in the same market and the applicable rate is supposed to reflect current yield requirements. There are some differences in costs between companies reflecting differences in leverage or in underlying commercial risks. Except for these differences, which should be non-existent for companies having similar risks and similar leverage, equity costs for all firms should be the same. This being the case, it is rather surprising that it was not until 1982 that any major regulatory body moved to eliminate this issue from individual rate cases and consolidate all equity rate of return matters in a single proceeding setting a "generic" common equity return for all regulated companies within a given class. The U.S. Federal Energy Regulatory Commission moved to do so in 1982 for electric utilities under its jurisdiction [20 FERC ¶ 61,211; Docket RM 80-36, Aug. 26, 1982] and has since moved to apply the same procedure to natural gas pipelines under its jurisdiction. The procedure adopted provides for risk classification of the utilities, and the setting of rates of return for each risk class on a common basis. Embedded debt and preferred stock costs will continue to be determined in individual rate cases, where they are, as noted above, non-controversial.

This method of dealing with the problem has much to commend it and should be a feature of any regulatory model adopted for the housing industry. The only serious criticism that can be raised regarding the F.E.R.C. procedure is that the generic rates are not changed frequently enough to track changes in market yields more closely.

We recognize that landlords are a much more diverse group than electric utilities and natural gas utilities, at least in size and legal type of organization. We are much less certain that risk differences among residential landlords in any given city are significantly greater than the risk differences found among natural gas pipelines and distributors. As Chapter 3 above makes clear, we have been unable to generate any but the most casual evidence that small landlords' opportunity costs of equity capital and the risks that they bear, are significantly higher than those of corporate landlords, nor that they are not. For many small landlords, we would expect the issue to be rendered most by the exemptions of single family dwellings, duplexes and fourplexes suggested above; for the rest we suggest the issue requires determination at a generic cost-of-capital hearing. It would be important to secure wide participation in such a hearing, selective support of the costs of participants might be useful in ensuring that all reasonable points of view were represented. In this respect we note, as an appropriate example, the procedures of the Alberta Public Utilities Commission with respect to intervenor costs. The decision as to which groups appearing at any generic cost-of-capital hearing should be taken as it is so in Alberta; submissions helpful to the Board are allowed costs; at least some groups of landlords should be treated as intervenors in this context.

7. The Use of Automatic Adjustment Mechanisms

Where an increase in a regulated company's cost of service is due to nothing more than a change in the price of an input over which the company has no control, the outcome of an application for increased rates is more or less predictable, and there is little need for a hearing except to produce evidence that the increase in input cost did in fact occur. Where that fact is public knowledge, even that step can be dispensed with. Consequently the use of automatic adjustment clauses to permit the adjustment of rates to pass the increased cost on to customers has become a common practise where cost increases are due to fuel costs, property taxes, and similar items of expenditure. Not all jurisdictions follow the practise. Some critics have noted, correctly, that it removes any incentive for the regulated company to economize on the use of the input whose price has increased. This is true, at least in theory, but in many regulated industries the ability to substitute one input for another is very limited in the short run. A pipeline could save on fuel gas inputs by altering its pumping stations to use another fuel; or by increasing line size to handle larger throughput for a given horsepower [Cookenboo (1955); Callen (1976)]. Both alternatives involve significant capital costs, the latter the virtual replacement of the existing system. Neither is likely to be an economic alternative unless the fuel cost increase is very large. None have done so even with the very large fuel cost increases since 1973. To the extent that substitution is economically feasible, it is more likely to be undertaken by a regulated company which receives higher rates due to a price change, subsequently altering its input structure to maximize profits, than from

one which is forced to pass on the fruits of such substitution immediately. It is also possible, but hardly likely in a period of general inflation, that the costs of other inputs have declined so that the full amount of the increase in the price of the specified input is not necessary to make the company whole. It would appear that many of those objecting to automatic escalator clauses seek, in reality, not so much to scrutinize the transactions in question, as to subject the regulated company to a full-scale rate case as frequently as possible. In any system in which additions to the cost of regulation are weighed against the potential benefits of more detailed regulation, automatic adjustment clauses should be used as extensively as possible.

In the rental context, the following categories of expenses are appropriate candidates for the use of automatic escalator clauses.

(a) Fuel, power, water, sewage and waste disposal services,

(b) Municipal taxes,

(c) Embedded debt costs,

(d) Common equity rates of return where these are periodically adjusted in response to a generic cost of capital finding.

Escalator clauses of the above types are contingent on the occurrence of price changes in an input. It is also possible to ease the regulatory burden by applying a uniform escalator to existing rates, allowing increases up to the specified amount without proof. Under such a system, only those whose cost of service had increased by more than the specified amount would need to, or be able to claim a larger increase in rates, requiring detailed regulatory scrutiny. There is such a provision in the current rent review system.

Where such a system is applied, care should be taken to review total cost-of-service and not just the annual increase. Abuses in which a company manipulates maintenance costs, holding them down in certain years and claiming the allowed automatic percentage, playing catch-up in a subsequent year and showing a whopping increase to be passed on after detailed review are possible and all too likely where the sole focus is on the annual increase.

8. Outline of a Regulatory Model

The following section describes a regulatory model which respects the essential features of the cost-of-service framework, while at the same time responding to the need to minimize detailed record keeping and the other costs of the regulatory process. The model described would apply only to those properties which did not qualify for exemption as described above. In addition to these exemptions, a flat-rate-increase alternative, allowing an increase in rents at a rate somewhat lower than the rate of inflation, as at present, should be retained, for those landlords who find this alternative more desirable than the pursuit of a formal application for a larger increase.

We note that allowed increases on a flat rate basis, under the present review scheme, have been consistently set below the rate of inflation. This scheme, and the rents determined under it have not attracted capital into rental housing at a rate fast enough to increase vacancy rates. The flat-rate alternative plays an important role in the proposed regulatory scheme, since it is the only alternative economically open to the small landlord who does not wish to associate with a group. Keeping the flat-rate increase below the rate of inflation will encourage more

landlords to seek formal cost-of-service reviews and could very well clog the regulatory mechanism with a backlog that could take years to process. To avoid such a backlog, we would propose that the flat rate increase be calculated annually, at a rate at least 1 per cent, and preferably 2 per cent in excess of the realized rate of inflation in the prior year. The ability to regulate is contingent on there being a high rate of "opting out"; in effect this involves using rents of major landlords regulated on a cost-of-service basis, as a control device; should exempt on opting out landlords seek to charge more, vacancy rates can be relied upon to provide a measure of discipline.

A central role in the proposed plan would be the register of values suggested above, which would record the 1985 value of each regulated property registered, its cost if constructed later, plus capital improvements made subsequent to construction or the inception of regulation whichever occurred later, and changes in value resulting from changes in price levels in subsequent years. No owner would be required to register; the only avenue to rent increases open to the owner of an unregistered property would be the flat-rate increases referred to above. Registered values would have to be established by the regulatory body, on the basis of evidence filed by the landlord and/or tenants; once established they would bind subsequent owners (except, of course, for additions reflecting the cost of improvements). It is not anticipated that any hearing process would be involved; the landlord would file evidence on construction costs or purchase costs, and the application of depreciation and trending factors would be automatic. Tenants would be advised and could file objections within 30 days. The regulatory would then make a finding as to value. Unless these were grounds for an

appeal, that finding would be conclusive. Registered values should be divided into land value and building value components.

Allowed rents would be the sum of four components:

(a) An operating cost component

(b) A debt service component

(c) An equity return component

(d) An income tax component.

(a) The Operating Cost Component

The operating cost component would, as its name implies, cover the current expenses (other than interest, amortization of debt and other capital-related items discussed below) incurred in owning and operating the property, including operations, maintenance, utilities, taxes, and administration costs, including a suitable allocated share of the landlord's overhead costs. Records would have to be kept in a form prescribed by the regulatory body, and increases in these expenditures would qualify for automatic pass-through once their occurrence had been verified.

(b) The Debt Service Component

The debt amortization provision would include the recovery of embedded interest cost on the outstanding debt, plus the annual depreciation charge computed on the 40-year, 10 per cent depreciation basis noted above applied to the trended capital cost for the year in question. It is quite possible, under certain circumstances, that the cash flow from this source would not, in the early years of the life of a heavily mortgaged property, be sufficient to cover mortgage payments. Our analysis suggests, however, that with an allowed (real) equity return of 10 per cent, applied

to 80 per cent of the asset value, an embedded debt cost of 12.5 per cent applied to the rest, and 40-year depreciation on 10 per cent sinking fund basis, there would be a significant excess of cash flow over debt service requirements even in the first year of operation; after that the coverage improves. The relevant figures appear in Table 4-1.

Changes in debt servicing costs resulting from renewals of an existing partly-amortized mortgage at a higher (lower) rate should be passed on immediately, changes resulting from an increase in the face amount of the debt outstanding should be allowed only to the extent that there is a corresponding reduction in the equity return component of the allowed rent. This implies, basically, that the assumption of additional debt would be deducted except in cases where the nominal cost of the debt was less than the real cost of the equity it replaces.

Where a new mortgage is written to replace an existing partly-amortized mortgage at a higher (lower) interest rate, the portion of the increased charge representing the application of the higher (lower) rate to the existing unamortized balance of an existing mortgage will be reflected in the allowed rent at such time as a higher (lower) interest rate would have become applicable under the old mortgage.

(c) The Equity Return Component

This component is an addition which has no counterpart in the present scheme of regulation. The equity base will be that portion of the registered value that was not represented by outstanding debt at the time regulation commenced, less an amount in respect of increases in debt to be computed as specified below, and less depreciation payments as defined below.

TABLE 4-1

Comparison of Cash Flows, 10% Real Return,
40-year Amortization on 80% of Cost,
12½% Mortgage, 80% Debt Financing

(Unit Cost $100,000)

Return Allowed plus Depreciation		
Embedded Debt Cost	80,000 x .125	$10,000,00
Equity	20,000 x .100	2,000.00
Depreciation (40 yrs. SF @ 10% x 80,000)		180.72
		$12,180.72
Mortgage Amortization ($80,000)		
@ 12.5%, 25 years		$10,554.72

Registered value will be divided into two components, a land value component and a bulding value component. The latter and additions will be subject to appreciation, the former will not; the initial allocation of registered value will be based on the allocations between land and building costs chosen for income tax unless the regulatory agency is persuaded, by evidence presented by the landlord to the regulatory agency that an alternative split of values is appropriate. Tenants should be permitted to present evidence, subject to the usual safeguards of due process, to the fact that the land/building split is different from that submitted by the landlord.

It will be adjusted annually for price level changes and accrued depreciation. The land-building split will be used to determine the fraction of assets to which a depreciation allowance applies.

In addition to the land-building split, the registered value should be divided into a debt component, and an equity component. The debt component would equal the balance owing on outstanding mortgages and other debt-equivalent instruments (i.e., certain agreements-for-use). The equity component would include the balance.

The return allowed on the debt component would include all embedded debt costs, including interest charges and amortization of discount (less amortization of any premium). On the balance an equity return would be allowed.

The equity return component should be calculated on the required (real) return on equity times the equity component of the registered value, the former established not less frequently than every two years and estimated as the current acquired nominal equity yield less an estimated rate of inflation which shall not be less than that experienced over the last two years.

(d) The Income Tax Component

This component has no counterpart under the existing regulatory structure. The purpose of this component is to ensure that the after-tax return is sufficient to provide an equity return at the approved rates. It can be found by grossing up the equity return component at the appropriate marginal tax rate for the group, and deducting an annual amount, equal in present value, at the approved equity rate, to the present value of the depreciation tax shields provided by the capital cost allowance. This component is of particular importance because failure to provide for the coverage of tax liabilities will prevent the attraction of capital. There are certain provisions of the Income Tax Act, e.g., the treatment of CCA, which permit the deferral of tax liability; the proposed treatment levelizes the required tax payment in the rental stream, exceeding the tax liability in early years and falling short in later years. This is preferable, in our view, to a "taxes paid" approach in terms of doing equity as between initial and subsequent tenants, and has attractive capital-attraction features as well.

9. An Example Using the Proposed Regulatory Model

For this example we assume that a new unit costing $35,000 is constructed on land worth $5,000, but assume it is financed with a $32,000, 25-year mortgage at 3.5 per cent. The approved equity return in this no-inflation case is 9 per cent. Initial allowed rent is computed as follows:

(i)	Operating Cost Component		$ 2,400.00
(ii)	Debt Service Component		
	Interest 5.5% x 32,000	$1,760.00	
	Depreciation, 40 yrs. SF @ 9%	94.70	
			1,854.70
(iii)	Equity Return		
	8,000 x 9%		720.00
(iv)	Income Tax Component (T = .50)		
	$\frac{T}{1-T}$ x Equity Return 720.00		
	minus annuity equal in PV to tax shield 348.00		372.00
	Allowed Rent		$5,346.70

10. What Happens if Circumstances Change?

(a) Change in Interest Rate

Assume, after the property has been held for 4 years, inflation raises all costs by 10 per cent and the interest rate rises to 12.5 per cent. The real equity return remains at 90 per cent. Allowed rent would not incrase as follows, assuming a 10 per cent increase in operating costs in the 5th year.

(i)	Operating Cost Component.....		$2,640.00
(ii)	Debt Service Component		
	Interest @ 12.5% on remaining mortgage of $29,283.65		3,660.46
	Depreciation @ 40 yrs SF @ 9% (5th year) x CPI index 1.10		
(iii)	Equity Service Component		
	Original Cost	$40,000.00	
	Less Depreciation	473.90	
	Depreciated	39,526.10	
	Trended to	43,478.71	
	Less Debt	29,283.65	
	Equity Base	14,195.06	
	Return @ 9%		1,277.55
(iv)	Income Tax Component		
	$\frac{T}{1-T}$ x Equity Return	1,277.55	
	Minus annuity equal to CCA on Tax Shield	275.00	1,002.55
			$8,580.56

We note that the increase in rents is significantly greater than the rate of inflation. The principal culprits are the higher interest rate and the income tax component, which taxes illusory inflation-induced gains. The required increase is however, smaller than the increase that would be required under an original cost regime, while the equity rate of return would also have to be escalated to reflect the inflationous environment.

11. Some Residual Problems and Concluding Observations

The system outlined above is not perfect. Indeed it relies for its very workability on the exemption of small units and the anticipated "opting-out" of the majority of the rest, in the belief that rents which attract capital into the construction of larger units will set the competitive level in the marketplace; this is of course assuming that rents are high enough to attract capital in that sector. They are clearly not, under the present system.

One area of concern not addressed specifically above is that of residual land values. While we recognize that these may have constituted a significant proportion of the return realized by landlords over the past generation, the regulatory model outlined above will restrict increases in value, for occupied buildings; while there may be some acceleration in demolitions, the date at which residual, land values can be realized is remote enough, for most properties, to be of negligible worth in present value terms, and has a correspondingly minimal impact on realized rates of return. We believe that regulators have better things to do than to try and reduce rents by an amount reflecting such gains as might be anticipated.

The scheme proposed above bears a strong family resemblance to the present scheme. It is more complex, appreciably so. Where it parts company with the present scheme is in making an explicit provision for a return on the landlord's equity and for the income tax liabilities associated therewith. In the present system the return to the landlord, if any, emerges as a residual and cannot by reason of its inadequacy form the basis for an increase in rent. This, in our view, is the major defect of the present system and its lack is the chief reason why equity investment in rental real estate subject to control is of little or no interest to investors and why values of rental properties have declined. The securing of an adequate flow of equity investment into rental housing can only be accomplished if an attractive return is provided on new housing and if fair treatment to equity investors in existing properties is provided, since such treatment is apt to be viewed by potential investors as a foretaste of their ultimate treatment. The proposed scheme of regulation provides such a return.

It is quite possible, we believe, that within a decade of operation under the system proposed above, and assuming that rates of return sufficient to attract capital were allowed, regulated rent levels would exceed market-clearing rent levels and that the latter would prevail, rendering regulation redundant. This is a desired goal of virtually all concerned in the process. The question arises as to whether, if that is the case, it would not be sufficient to state an intention of abandoning controls after a similar period, increasing annual increments obtainable without review to a rate in excess of the rate of inflation, and leaving it at that. Our review suggests that this would be unwise, that the

significant minority of landlords who have failed to realize appropriate returns on equity through the present review process represents a fraction of those failing to earn such returns, and that a more drastic change in policy is required if equity funds are to be attracted into the industry once more. No promise of future deregulation which does not provide a significant measure of current relief and an automatic adjustment mechanism to ensure that relief continues is likely to be credible, given the history of rent controls. It is the immediate features of any such promise that carry weight in the capital market. For that reason, a transition to the regulatory model suggested above should be carried out; should it prove redundant in four years instead of ten, we should all be pleased at the outcome.

Appendix 4-1

Sample Valuation Coefficients for Buildings acquired on Different Dates
(Sinking Fund Depreciation, 9%, Original Cost $10,000 Nominal)

Year of Acquisition	Depreciated Value (V) Nominal $/$ Cost	Price Index (P) 1981 = 100	Adjustment Factor (A) P_{85}/P_2	Valuation Coefficient (V) x (A)
1985	1.0000	127.2	1.0000	1.0000
1984	.9970	122.3	1.0401	1.0369
1983	.9938	117.2	1.0853	1.0786
1982	.9903	110.8	1.1480	1.1369
1981	.9865	100.0	1.2720	1.2548
1980	.9823	88.9	1.4308	1.4055
1979	.9777	80.7	1.5762	1.5411
1978	.9728	73.9	1.7212	1.6744
1977	.9674	67.9	1.8733	1.8123
1976	.9615	62.9	2.0222	1.9444
1975	.9550	58.5	2.1744	2.0765
1974	.9480	52.8	2.4091	2.2838
1973	.9404	47.6	2.6949	2.5343
1972	.9321	44.3	2.8713	2.6764
1971	.9230	42.2	3.0142	2.7821
1970	.9131	41.1	3.0949	2.8259
1969	.9023	39.7	3.2040	2.8910
1968	.8906	38.0	3.3474	2.9812
1967	.8778	36.5	3.4849	3.0591
1966	.8638	35.3	3.6034	3.1126
1965	.8486	34.0	3.7412	3.1748

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